

COAL AGE

Volume 17

New York, February 19, 1920

Number 8

Shall We Store Coal in Summer or Dollars in Winter?

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WING to the unusual degree with which the public, and especially the Railroad Administration abstained from the buying of coal during the early part of the past year, and to the coal shortage that has followed, the coal industry has managed to convince the public that it should buy coal early and spread the production evenly over the entire twelve months. Owing to the mine workers' bitter complaints and their loud demands for more wages, the public has begun to see that it is both fruitful and fair to do something to relieve the seasonal condition of the coal industry.

But it behooves the industry itself to take stock of the situation and question whether there is not some duty that can be performed by those employed in producing coal to alleviate the situation. Unfortunately, the miner is prepared to argue that the consumer, who may be only a poor man after all, should save money and buy coal when he does not need it, in order that he may have it on hand when he desires to use it. He is asking the consumer to exhibit a frugality and foresightedness in which the miner himself is too often lacking.

There is no reason why the miner should not work his hardest in the winter and put away his money so that he can meet the trade depression which begins in April and lasts often until the early fall. Too many miners, in the winter, desire to work only as much as will enable them to make living expenses during that period of the year. Three days a week and five hours a day are too often the total effort that can be obtained from the miner, and as a result he is not able to lay by for the period of slackness which occurs in the summer.

Civilization has been described as a foresighted preparation for future needs. The difference between

the lower animals and man is the fact that for the most part the animal is disposed, and able only, to look after immediate necessities. He cannot prepare for the difficulties with which he may be faced in the future.

Too many mine workers are disposed in the winter to let the summer take care of itself. That statement is as true as another which has more general currency, namely that the consumer is willing in the summer to let the winter look after its own problems.

As one looks over other fields of enterprise one notes a different disposition among workingmen. The farmer, the carpenter, the paperhanger and decorator, and the man who moves goods from place to place, just to mention a few of an extremely numerous body of men, work their hardest when the opportunity to work is furnished them, knowing that the chance to labor is not spread in equal measure the year over. By this means they keep needless men from thronging into the industry. They fill the need of the hour, so that no one notices the scarcity of help in the time of need, or at least suffers so much from it as he otherwise would. The labor market is not, therefore, cluttered with men who must necessarily during the period of short demand find time hanging heavily on their hands.

The coal miner is responsible for the slow time from which he suffers during the summer. If he had been more keen to work in the winter and less disposed to leave his work to hunt or to observe all kinds of festivals and to lay-off for all kinds of imaginable causes, he would have had less men in the industry in the summer to compete for the little work that is then available. There should be no difference in the attendance at the mines between the early portion of the fortnight for which payment is made and the last few days toward the end of the pay period.

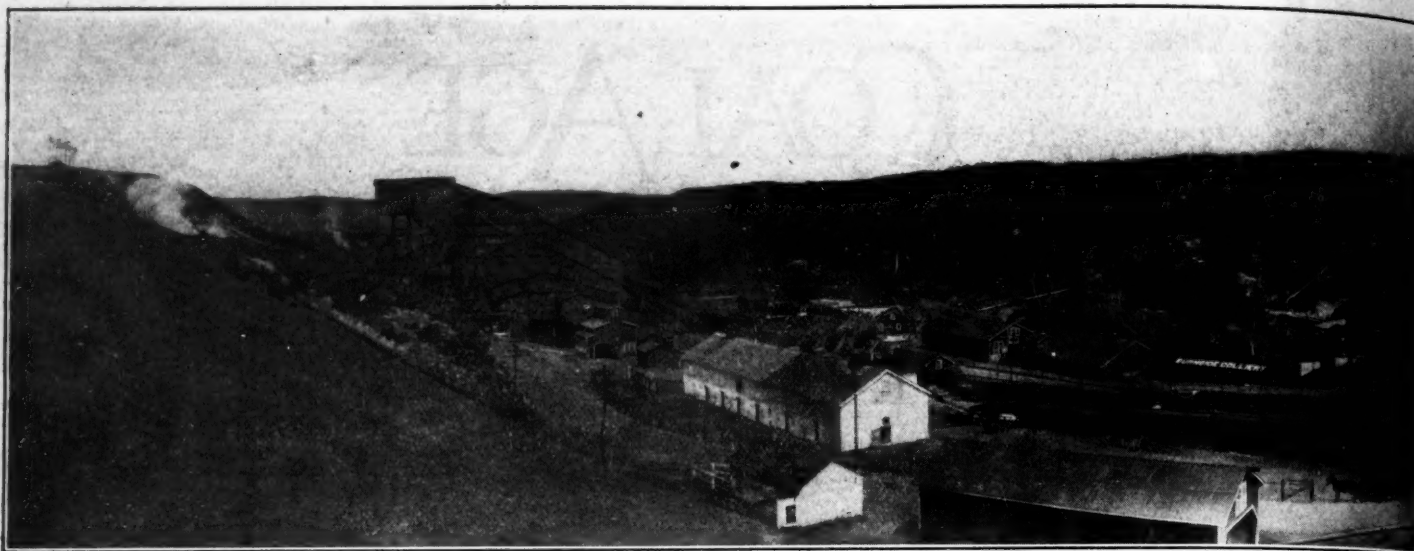


FIG. 1. PANORAMIC VIEW

Burnside Colliery of the Reading Company at Shamokin, Pa.

Although Intricate, the Process of Preparation Is Thorough—Concrete, Steel and Other Incombustibles Have Been Employed in Remodeling This Colliery—Much Ingenuity Is Exercised in Securing Ample Water Supply.

ALTHOUGH the Burnside Colliery of the Philadelphia & Reading Coal & Iron Co. near Shamokin, Pa., is not entirely new, a number of features both underground and on the surface have been embodied in it that are of interest. Some innovations not in common use have been adopted at this colliery. The surface plant has been entirely remodeled during the past few years which makes the colliery one of the really new and model installations in the southern anthracite coal field. The system of mining in itself is not different from that followed in numerous other collieries in the field, but some uses of materials underground possess possibilities to which attention should be called. That which most impresses a visitor to this mine is the amount of concrete used throughout the operation, particularly at important points. The mine abounds in numerous concrete arches, columns and walls. This can be readily seen in the accompanying illustration (Fig. 4) showing a heading on the bottom lift of the shaft.

All these concrete supporting structures are protected from having any great weight thrown suddenly upon them. This is accomplished by providing a cushion of

timber between their tops and the weight they must sustain. A sudden load would thus be applied to the timbers first and must crush them before acting on the concrete. This tends to prevent the concrete from cracking because of sudden stresses, allowing it to take the

load gradually from the timber. The timbers employed are small, not being over 3 or 4 in. thick. Another underground feature that attracts attention is the mine stable. This is on the second level of the mine and is probably one of the cleanest, best designed and best equipped existing in this section of the coal fields. In compliance with law, no wood is used in its construction except for the flooring, and the columns and supports for the roof are made either of cast iron or concrete. The mangers, built of concrete, are designed for two mules. They

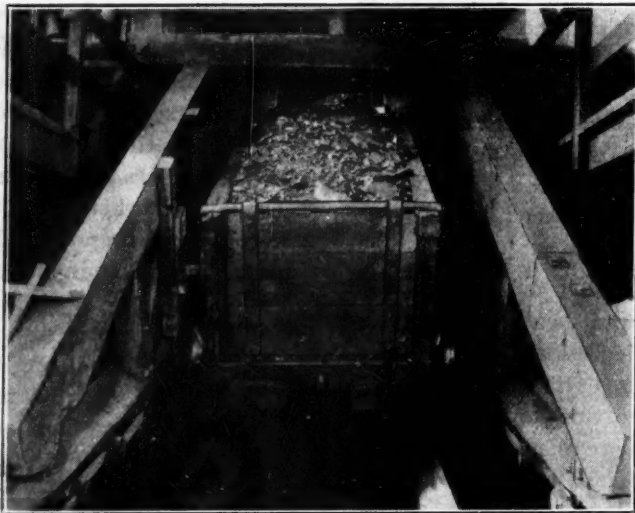
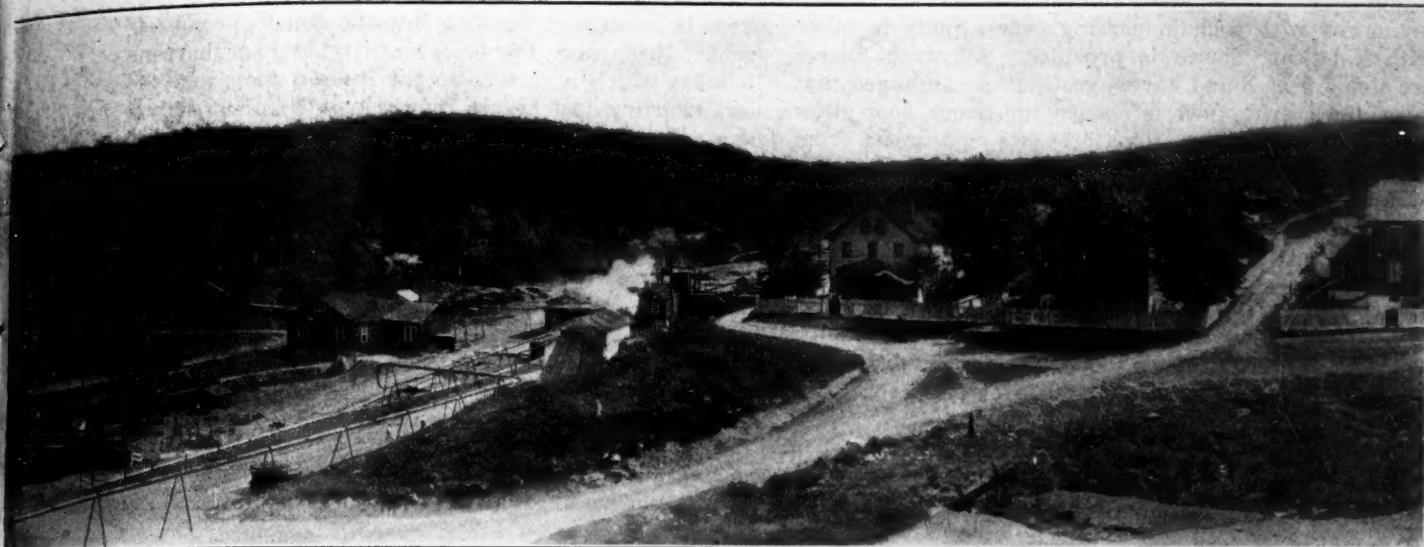


FIG. 2. CAR DUMPING AT TOP OF CAR HOIST

are 10 ft. long with a small box at each end for the grain feed with a large space between them for the hay. These mangers are arranged in one straight line so that it is possible to have a track on which is a small car to carry the feed from the feed room to the manger. Back of the mangers, at a sufficient distance to allow plenty of room for the mules, another track is laid on



OF THE SURFACE PLANT

which the car for removing the manure is run.

One particularly interesting feature of the stable is the method by which the mules are watered. A 10-in. pipe has been cut in half and run just between the feed track and the mangers. This pipe is so arranged that it is kept full of a running supply of fresh water, allowing the mules to drink whenever they desire. Fig. 1 shows the interior of the stable and the watering trough.

To the left of the entrance to the stables there is a large feed room. In this the grain feed which consists mainly of oats together with a little corn is kept in large waterproof iron boxes. The hay is stacked up on one side of the room. Practically no dampness is encountered in this room because a steam condenser here installed keeps the temperature rather hot and drives off the moisture.

MEN'S ACCOMMODATION LOOKED AFTER

At each of the shaft stations concrete rooms supplied with benches are built for the accommodation of the men waiting to go to the surface. The approaches to these waiting rooms are so arranged that the men do not have to cross either the loaded or empty tracks at the shaft bottom nor any of the main haulage tracks. This tends toward safety at all times.

The waiting room and the pump room at the bottom of the shaft are one and the same structure. A duplex Jeansville pump 23 and 40 x 12 x 48, is here installed. This has a vertical lift of 730 ft. and a capacity of 2,000 gal. per minute. The water from this pump is discharged into a creek on the surface and flows a distance of about 400 ft. when it is again picked up by another pump and used in the breaker. A description of this latter will be referred to later. The roof of the pump room is supported by concrete arches surmounted by lagging made from old 40-lb. steel rails. Fig. 9 shows the pump end of the waiting room. At the junction of all headings and manways a sign is placed giving full directions as to how to go either to the shaft bottom or to the foot of the main manway.

The underground hospital at this mine is well equipped and absolutely fireproof, no wood being used in any part of its construction. The end wall is built of concrete and has a steel door, and the three closets at the rear are of concrete with steel doors. The floor is of concrete. The roof is the natural rock. Hot and cold water is

supplied at a wash basin just to the left of the entrance. The furniture is substantially built and is covered with black oil cloth. The closets contains a full supply of everything needed in the hospital. On the wall at the right of the entrance is the stretcher. A man is in continual attendance.

On the surface one is impressed with the beautiful lawns that have been laid out and the general cleanliness and attractiveness of the grounds and buildings. This is well shown in the panoramic view Fig. 1. The paths and walkways have been so laid out that it is absolutely unnecessary for any man to cross a single track or conveyor line in order to go from one part of the plant to another.

All the buildings are of the same general design having concrete foundations and concrete sidewalks to a height of about 8 ft. Above this height the construction is of wood. The wood work is painted red and makes an attractive contrast against the green lawns and white concrete.

The men's welfare is as carefully guarded on the sur-

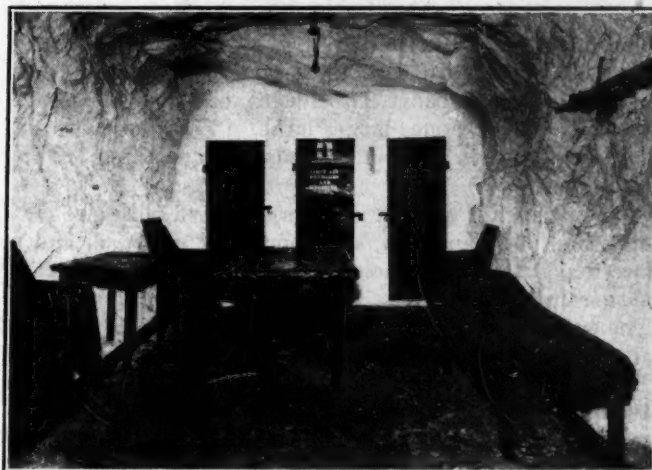


FIG. 3. INTERIOR OF MINE HOSPITAL

face as underground. This company has established excellent wash houses built of brick with concrete floors and wooden roof trusses. The wash house at this mine has a capacity for 340 men. The usual arrangement for taking care of the men's clothes by raising them up

in the air with a chain passing over a pulley together with a locking device is provided. All wash houses are steam heated and have a vestibule so arranged that when the outside door is opened the inside door stays closed and vice versa. This prevents cold drafts from striking the men while they are dressing. One shower bath is provided for each 20 men. The fire bosses, assistant mine foremen, etc., have their own separate wash house which accommodates about 20 men.

The use of the old-fashioned safety lamp has been dispensed with as much as possible at this colliery, these lamps being now used for testing purposes only. The Edison electric head lamp has been substituted. The lamp house has a complete charging outfit for about 100 lamps.

A well-equipped machine, carpenter and car shop combined has been built at this plant. The machine shop proper is provided with a large shear capable of

drops it through an opening into the dull tool compartment. From here the blacksmith takes and sharpens it, after which it is sent to the issuing room and the next morning just before the miner goes underground he goes to this point and procures the tools which are marked by his check and which are issued to him by the room clerk. This prevents a man from getting someone else's tools.

The car-supply house is divided into four rooms. The first two are small and in them the metal parts of the mine cars are kept. Immediately adjoining these is the lumber stock room. This lumber room is divided into a number of sections by iron pipes, which extend from the floor to the ceiling. Each section is distinctly marked showing the size of the pieces stored therein. Each course or layer of lumber is separated from the courses adjoining by small strips of wood allowing a free circulation of air thus preventing warping.

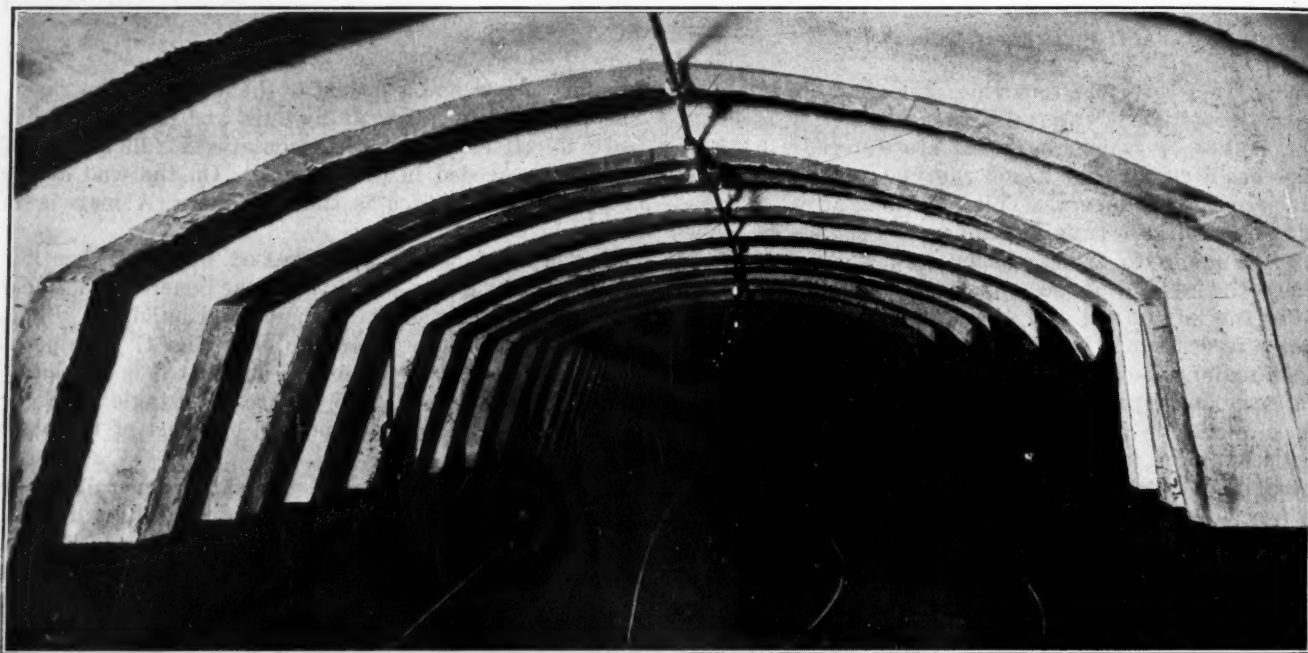


FIG. 4. CONCRETE CONSTRUCTION ON HEADING ON BOTTOM LIFT

cutting a piece of iron 6 in. wide by 1 in. thick, a Leyner Drill Sharpener, (also equipped to make bolt heads), a bolt threader, two forges, one drill press, one steam hammer, one large lathe. This lathe is so arranged that it can cut threads on pipe up to 10 in. in diameter.

The carpenter and car shop is equipped with two cut-off saws, one band saw, one mortising machine, and a two-ton Yale electric hoist for handling the mine cars so arranged that it can be used as a travelling crane. The cutoff saws are provided with special safety devices for the protection of the men as is also the emery wheel. Besides the machinery already mentioned, there is here installed a roll in which the sheet iron that has been used in chutes, underground and on the surface are straightened out allowing its reuse.

EVEN MINERS' TOOL HOUSE IS OF CONCRETE

A small concrete building called the miners' tool house is also here used. This is divided into two parts, one for the reception of dull, and the other for the issuance of sharpened tools. When a miner desires to have any tool sharpened he attaches his number to the tool and

The fourth compartment of the supply house is so arranged that in summer it can be used as an outside repair shop. The men working on the cars are well protected from the elements by a large shed roof and are much more comfortable than if working inside. During the winter all such work is done in the carpenter shop.

Another building is divided into three parts, one of which is used for the storage of cement and another for the storage of company tools. At the end of this building is a small room for the use of the men working in the timber yard.

The hoisting engine employed at this mine was built at the shops of the company in Pottsville and has a maximum capacity of 495 cars of coal a day, each car having an individual capacity of $2\frac{1}{2}$ tons. The most interesting feature of this hoist is the method used to allow either cage to be operated from any level in the mine. The two hoisting drums are entirely separate, but can be fastened rigidly together by means of a toothed clutch. This permits one of the drums to be held stationary by the brake, while the other drum with its cage can be run to any desired position in the shaft.

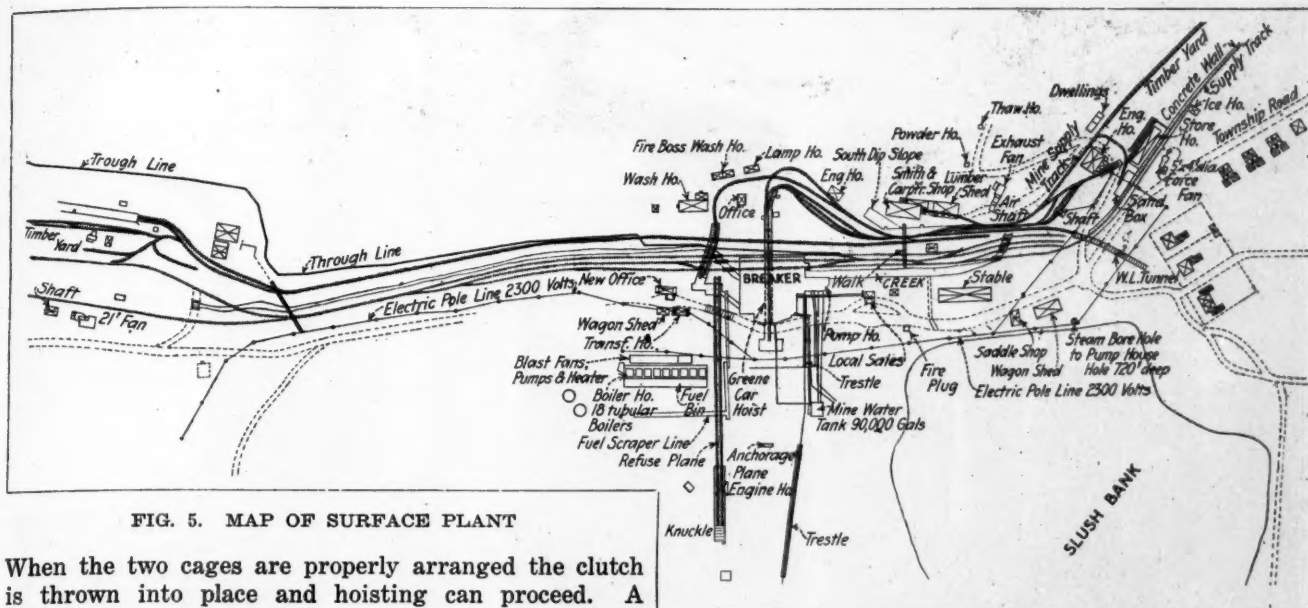


FIG. 5. MAP OF SURFACE PLANT

When the two cages are properly arranged the clutch is thrown into place and hoisting can proceed. A mirror is so placed that the engineer can watch the shifting of the clutch and see that it is in the proper position before it is thrown.

The timber yard is equipped with a steam drag saw built by the W. M. E. Hill Co. of Kalamazoo, Mich., that cuts all timber used in the mine and also notches it. Two timber cars are operated by means of a rope haul. Each car is about 30 ft. long and designed to carry one large stick of timber. It is run up to the drag saw and the timber cut. From there it goes to the finished yard where the cut pieces are piled according to their size. While this is being done the other car is being loaded. The yard for cut pieces is so arranged that when the

timbers are rolled off the timber truck they can either be placed in stock piles or immediately loaded into mine cars on the other side of the yard.

The supply house is divided into three parts, the first of which is used as an office and small electrical supply room combined. The second part is used for the storage of small supplies such as bolts, nails, rope and fire fighting apparatus. The third portion is used for the storage of heavy material such as bar iron, sheet iron, castings, etc. Everything is arranged in small compartments, distinctly marked as to their contents.

On the outside of the building on the opposite end

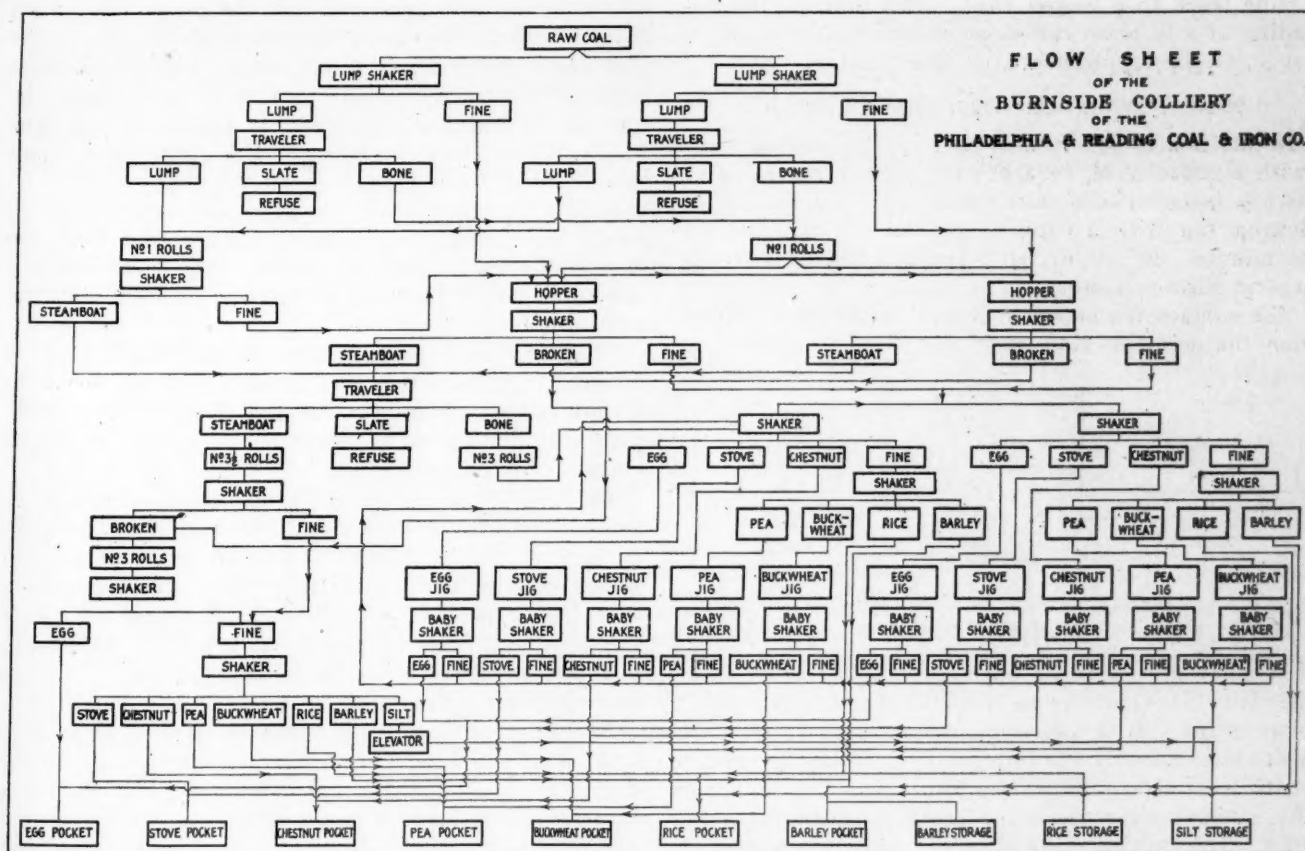


FIG. 6. THE INTRICACY AND THOROUGHNESS OF THE PROCESS PERFORMED IN COAL PREPARATION IS HERE SHOWN

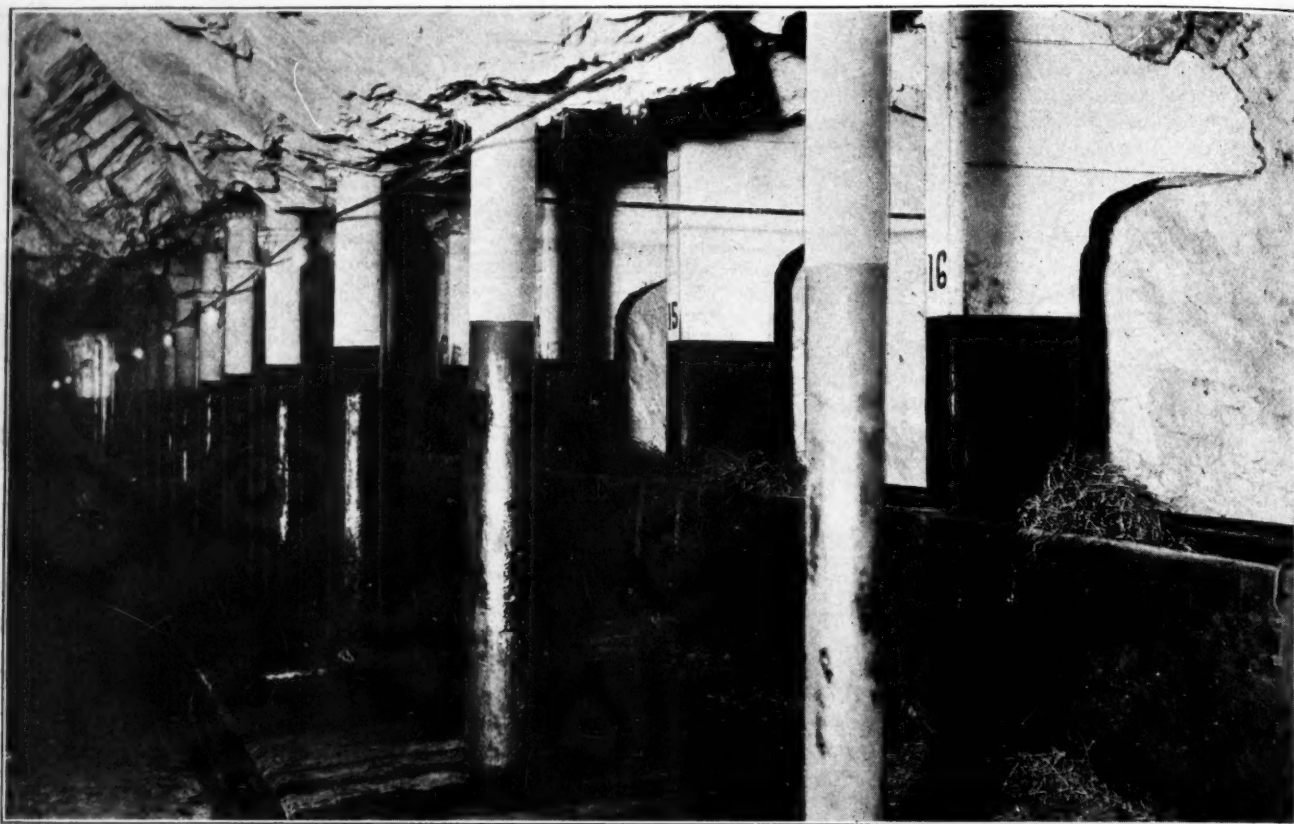


FIG. 7. INTERIOR OF STABLE

from the office a traveling crane is installed. This crane is a 6-ton Yale electric hoist mounted on a traveler. The crane runs from the salvage yard across the railroad track, past the end of the supply building, across a mine track to a wagon road. This permits the unloading of a railroad car direct to either a mine car, a wagon, or the supply house, or vice versa.

MINE VENTILATION WELL TAKEN CARE OF

In addition to the exhaust fan built by the company (with a capacity of 100,000 cu.ft. of air per minute) there is installed in a brick building a 4 x 6 ft. Jeffery blowing fan with a capacity of 100,000 cu.ft. of air per minute. This is driven through a belt by a 50 hp. General Electric motor.

The surface tracks are well laid out as may be seen from the accompanying map, Fig. 5. The breaker at

The Green car hoist above mentioned is 400 ft. long and extends to the top of the breaker. The cars enter on the lower deck of the hoist and are so placed that the doors are on the rear end. Upon arriving at the top a trip device is so arranged that the doors are opened automatically. The coal is dumped from the cars, while they are in motion, into a long chute, Fig. 2. The cars themselves never stop. As soon as a car reaches the top and is completely dumped it passes into a cage which lifts it from the lower to the upper deck where the car hoist takes it back down the slope. The cage, that lifts the car, works on a pivot and moves through an arc of 45 deg. There has never been the breakage of a single link on this car hoist. It is operated by a 150-hp. General Electric alternating current 440-volt 3-phase 60-cycle motor.

The water used in the breaker as mentioned before is pumped from the mine to a creek and from thence to a tank on the mountain side 125 ft. above the creek. This tank is made of wood and has a capacity of 90,000 gallons.

At times there is not sufficient water furnished by the mine and the creek for the operation of the breaker. It then becomes necessary to procure more water, and this is secured from the Stirling slope. The water from this slope is pumped to a trough or flume on the mountain side and flows by gravity to the creek at a point near the breaker from whence it is picked up by the breaker pump. The flume is shown on the map, Fig. 5.

The breaker is well protected in case of fire. Pipe lines from 1 to 8 in. in diameter are run throughout the building. Special nozzles are so arranged that the whole interior of the breaker can be drenched. Water is not allowed to stand in these pipes but in case of fire they can be filled and put into use by the turning on of a valve.

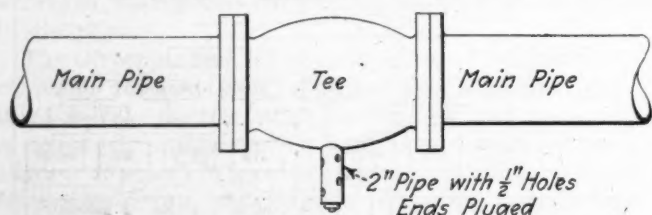


FIG. 8. SPECIAL NOZZLE USED ON FIRE PROTECTION SYSTEM IN BREAKER

this plant serves three openings, the Stirling slope, the water level and the main shaft. The loaded cars all come to the foot of a Green car hoist. Those from the water-level opening are brought by a trolley locomotive to the hoist as are those from the shaft. The cars from the Stirling slope reach the hoist by means of a tail rope. The cars carrying slate are placed on a separate track and run to the foot of the refuse hoist where they are dumped into a large hopper.

The coal after it is dumped from the mine cars is separated into two parts. These each pass over a lump shaker, which separates the lump coal from the balance. The lump coal then passes over a traveler (picking table) where the slate and bone coal is removed. The slate goes direct to the refuse chute. The lump coal from the two travelers passes through a No. 1 roll, and from thence to a shaker which separates the steamboat from the finer sizes.

The bone coal which was picked from the lump traveler passes through a No. 1 roll and then goes into a hopper. At the same time the coal which passes through the lump shaker and through the steamboat shaker is also delivered to hoppers.

From these hoppers the coal is fed by an automatic feeder to double-decked shaker screens on which the steamboat and broken are separated. The steamboat from these two screens is mixed with that from the first steamboat screen and then passes over a traveler on which the slate and the bone are picked, the slate going to the refuse chutes. The steamboat then is passed through a No. 3½ roll and over a shaker and the broken separated. The broken then passes through a No. 3 roll and thence over a shaker on which the egg is separated, going direct to the egg pocket.

The fine coal from the broken and egg screens then passes over a series of shakers where the fine sizes are separated going to their proper pockets.

The fine coal from the screen which separates the steamboat and broken passes over two shakers, which separate this coal into egg, stove, nut, pea, buckwheat, rice, barley and silt. The egg, stove, nut, pea, and buckwheat then pass through the jigs and from the jigs over baby shaking screens, which separate the under-

sized coal. The proper-sized coal then passes direct to the pockets. The undersized coal is carried by an elevator back to the last shaker for retreatment.

The rice and barley coal are not jigged but pass directly from the shakers to their respective pockets or to a storage pile. The bone coal from the steamboat shaker passes through a No. 3 roll and is delivered to the shaker separating the finer-sized coal just before they pass into the jigs.

TREATMENT OF EGG COAL

In case there are not sufficient orders to absorb all of the egg coal an arrangement is provided whereby it can pass into a No. 4 roll and then to the shaker that separates the fine coal that has passed through the egg screens.

The silt from all the operations passes into a tank just above the pump room and is fed by gravity to the silt pump which takes it to the top of the mountain to a storage pile. The method by which the coal is handled can be readily seen by referring to the flow sheet Fig. 5.

In the pump room in the breaker there are two sets of pumps, one of which handles the silt, which is smaller than barley in size, to the storage piles on top of the mountain. This pump is 16 and 24 x 14 x 36 in. and handles a sludge containing 25 per cent solid matter to a vertical height of 180 ft. The suction is so arranged that the sludge flows into the pump, by gravity, the storage tank being higher than the pump itself. This makes it unnecessary to agitate the material in the tank.

A separate building has been constructed for the accommodation of the domestic supply. The coal is

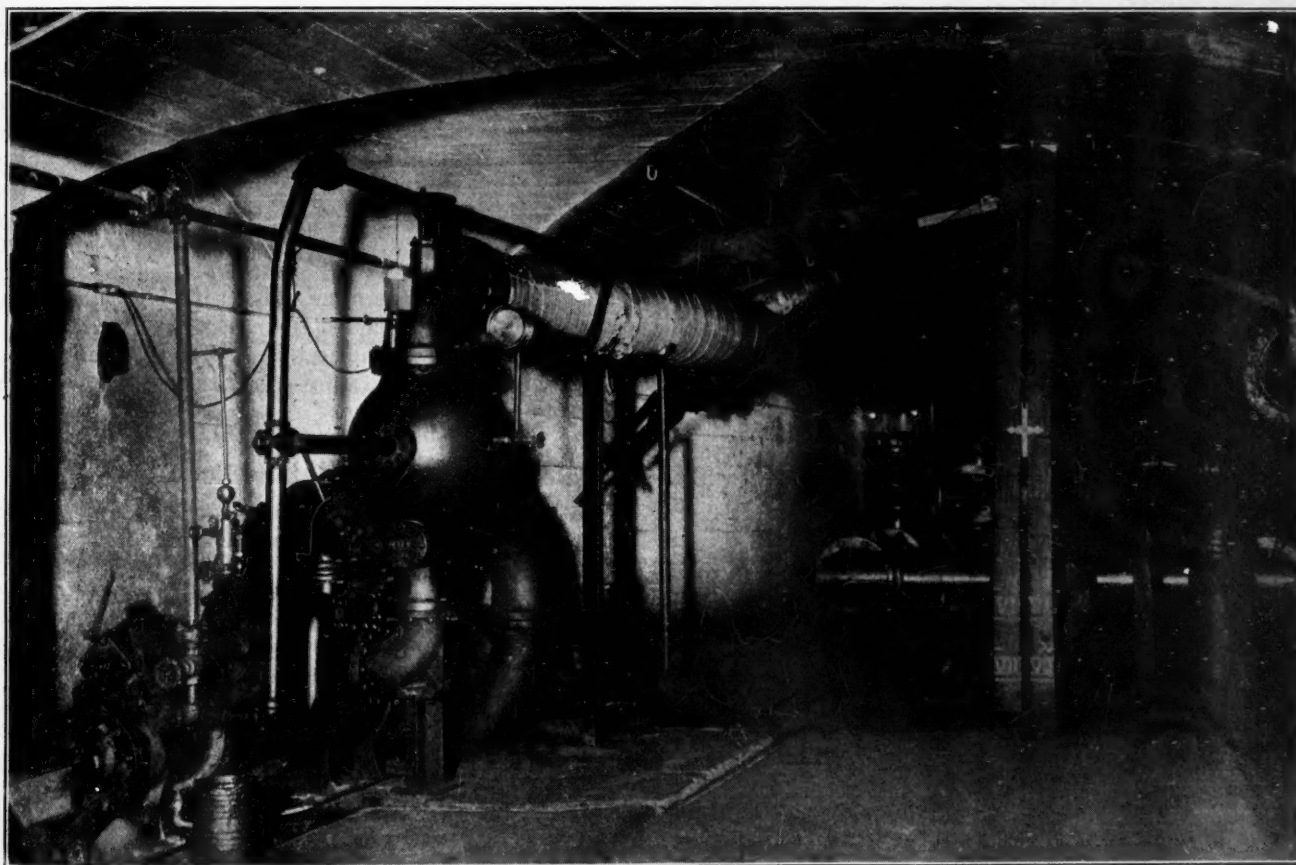


FIG. 9. PUMP END OF THE WAITING ROOM ON THE BOTTOM LIFT

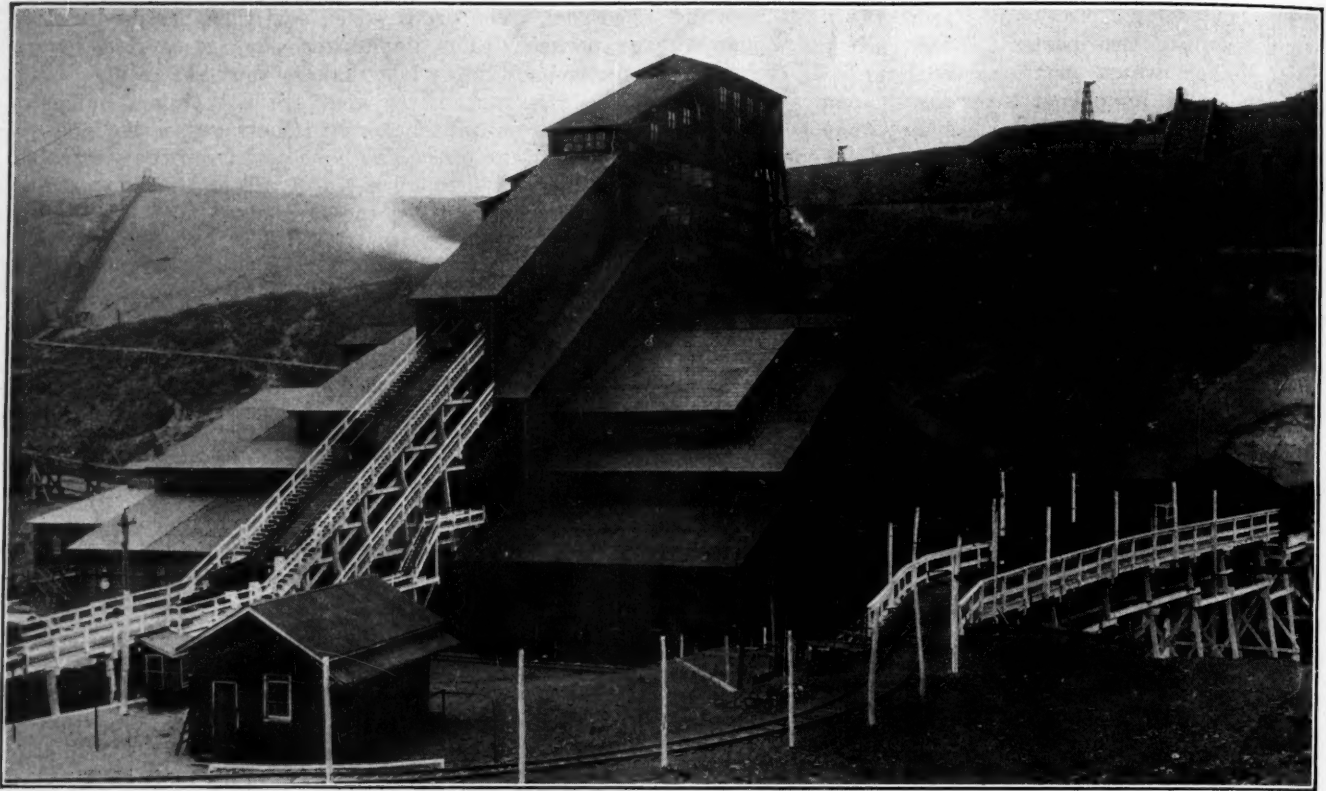


FIG. 10. CAR HOIST AT THE PLANT

brought from the bins in the breaker by means of a drag line conveyor to the bins in the domestic supply house. Arrangements are made to handle 6 different sizes of coal. The coal in passing from the bin to the wagon moves over a small screen over which a jet of water plays, washing out the fine material. The coal then passes over a chute into the wagon. At times instead of open wagons, covered ones have to be loaded and a special tilting chute which can be raised and lowered by means of chains is provided for this purpose, and deposits the coal in the rear end of the wagon.

CURRENT DELIVERED FROM SUB-STATION

There is no electric plant at this mine, but the current consumed is generated at the Bear Valley power plant, three miles away and is delivered to the sub-station in the boiler house at 2300 volts. The sub-station has two direct-connected motor-generator sets. One of these sets is a Ridgeway machine and consists of a generator delivering 250 volts at 900 r.p.m. and a 300-hp. motor using 2,200 volts 3-phase 60-cycle current. The other motor generator set is of General Electric manufacture. The motor is a type ATI 300-hp. 720 r.p.m. 2,300 volts 60-cycle machine while the generator is a type DMC 250 volts. The switchboard consists of six panels built by the General Electric Co.

The boiler feed passes through a large Cochrane-feed water heater. In the boiler room proper there are installed 18 return tubular boilers carrying steam at 110-lb. pressure. These boilers are all hand fired with a mixture of rice and barley coal.

The ashes from the fires are raked direct to a pit immediately in front of the fire door. This pit is covered with a steel plate, when the fire is not being cleaned. From the pit the ashes are sluiced by running water to a chute on the outside of the building, down which they pass to the bottom of the rock haul.

The power house is entirely of concrete construction.

On the wall of the boiler room directly in front of the boilers is placed a 12-in. spiral steel pipe provided with 2 by 6-in. slots covered with sliding doors. To one end of this pipe is attached an electric blower having a capacity of 5,000 cu.ft. of air per minute. By opening the slots it is possible to secure a circulation of fresh cool air during the summer.

The fuel coal supply is brought up from the breaker by a drag line conveyor to a point on the mountain side above the power house. From here it is discharged into a horizontal drag line conveyor and distributed to convenient points in the building. This also permits the storage of a large amount of coal at this point. By means of a series of chutes this coal can be returned to the breaker for the filling of orders.

The refuse from the mine, from the boiler house and from the breaker is hauled to the top of the mountain by a barney engine hoisting plane. The cars on the top are taken away to the point of discharge by a Porter steam locomotive.

Four Billion Balance of Trade

The excess of American exports over imports in 1919 amounted to \$4,017,000,000, a new record, according to a statement issued today by the Bureau of Foreign and Domestic Commerce. Exports for 1919 totaled \$7,922,000,000, as compared with \$6,149,000,000, while imports were valued at \$3,904,000,000, against \$3,031,000,000 in 1918.

December exports amounted to \$681,000,000, a falling off from the \$741,000,000 recorded for November. Imports also fell off for December, the total being \$381,000,000, as compared with \$425,000,000 for November. Both exports and imports were higher than in December a year ago. The imports of gold in 1919 amounted to \$77,000,000 compared with \$62,000,000 in 1918.

Germany's Coal Supply, Past and Present

BY M. MEREDITH
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IT MAY be truthfully said that Geheimer Berg-rat Stutz holds the fate of the German nation in his hand. For upon the coal he supplies every household depends, and so also every industry—all lighting, heating, cooking, and most of the means of transport. The organization over which he presides was established on March 1, 1917. Whatever previous government administration regulated the coal production and distribution during the war was more or less perfunctory. Herr Stutz, unlike most of the German ministers, public officials, and business men, is conversant with the coal problems of England and France and therefore realizes the difficulties which the allied countries have in assisting Germany in her plight—quite apart from the many sacrifices properly imposed upon Germany as the result of the war.

The output of coal in Germany, excluding lignite, amounted in 1913 to 15,960,000 tons per month, and July, 1919, to 11,805,000 tons per month (of which 800,000 tons came from the Sarre and 200,000 tons from Lorraine).

In 1913, 12,233,000 tons were removed from the Sarre district for German consumption, or roughly an average of 1,000,000 tons per month. In September, 1918, the amount received by Germany had fallen to 771,000 tons. From Alsace-Lorraine, in 1913, the amount received for German consumption was 3,816,815 tons, or roughly an average of 300,000 tons per month. In July and August, 1918, the output had fallen to about 200,000 tons per month.

The loss of the Sarre and Alsace-Lorraine coal fields will deprive Germany of an appreciable fraction of the coal supply she enjoyed before the war. The 7-hr. miners' day was not then in practice, and transport facilities and other conditions were satisfactory. Germany's production must suffer greatly for a long time from the reduced hours of labor. The gravity of the situation did not end with the enormous reduction in the amount of coal available. The question of transportation was probably equally as serious. From the Westphalian coal fields in peace time an average of 33,000 coal cars (each containing ten tons) were daily filled and shipped.

ONLY 23,000 CARS LOADED DAILY

During the war the amount loaded out daily fell to about 23,000 cars. The number of coal trucks now required by the mines in the Ruhr area daily amounts to 18,000, but this number was not available, mainly owing to an insufficient number of locomotives (5,000 engines having been handed over to France), and to the delay in the return of cars in which coal had been sent to France. The result is that on Oct. 1, 1919, 8,000 cars of the 18,000 daily required in the Ruhr district could not be supplied and on Oct. 10, 3,000 of the daily 18,000 could not be provided. Were it not for these difficulties the output would certainly reach 17,000-18,000 cars daily, and even more, as considerable quantities of coal lie on the mine-dumps—in the Ruhr district 669,381 tons (Oct. 6), in the Upper Silesia 575,000 tons (Oct. 4). The short-

age of locomotives was also intensified by the moving of the beetroot and potato crops.

From Upper Silesia the number of coal cars filled and despatched daily was: In peace times, 13,000; in war time, 11,000, and now, 4,000.

The Prussian railways in 1918 held reserves for 35 days' supply, and traffic was then much greater than now. Traffic on the Prussian railways has now been reduced to 56 per cent of the traffic of 1913, and the coal reserve amounts only to enough for 8 or 9 days (Oct. 8, 1919). In 1918, Bavaria, Baden and Wurttemberg had stocks for 56 days ahead. Bavaria has now coal for only 20.4 days (coal transport by the Rhine closes in winter Wurttemberg, 23.2 days, and Baden, 11.5 days.

SITUATION IN BERLIN BECOMES CRITICAL

In 1918 there was an average of 31 days' coal reserve in the gasworks throughout Germany. In 1918 Berlin had 35 days' reserves. On Oct. 1, 1919, the reserves at all the gasworks in the German Empire amounted to 1.8 day's supply, and in many places gasworks had been closed. On Oct. 8, 1919, the Berlin gasworks held only 4 days' reserve, and quite recently 2 days' supply was all that was available. The situation in Berlin was critical because, during the winter months, the railways in Upper Silesia are occasionally snow bound, thus interfering with the regular delivery of coal to the metropolis. It was more than likely that, before the winter was over, Berlin would be in darkness from time to time. In order to cope with the emergency, it was intended to institute public kitchens, at which the poorer classes could cook their food when the gas was cut off from their homes. Needless to say, political difficulties and riots were to be expected if there was no gas for heating or lighting in Berlin.

RATION CARDS DISTRIBUTED

Every consumer is rigorously rationed under a system of monthly ration card. A certain amount of coal is allocated to various districts or towns on the basis of the size of the towns and the industries therein. Before the war the average consumption per family of four persons was at least three times as great as that permitted at present. Furthermore, of the amount promised by ration cards (i.e., one-third of peace-time consumption) to communities of under 10,000 inhabitants, for three months, including August, 1919, the public had only received from the coal controller, in Prussia, 40 per cent; in Bavaria, 42 per cent (where some Bohemian coal had been received), or an average for the whole of Germany of 41 per cent. Of the amount promised by the coal controller, in towns of over 10,000 inhabitants, the population had only received, in Prussia, 56 per cent; in Bavaria, 31 per cent. Great towns, such as Berlin, had received 62 per cent of their promised allotment.

Industries were strictly rationed, and were controlled by the coal controller's inspectors, some of whom never left the premises in which the coal was

consumed. The amount the coal controller had been able to give, from April to July, inclusive, of the restricted supply was, in percentages:

Chemical industries.....	53.1 per cent
Glass and porcelain factories.....	46.4 per cent
Textiles.....	54.5 per cent
Iron and steel industries (metal and smelting works, mining, etc.).....	64.2 per cent
These received more because many lay near the coal mines, and therefore required no railway transport.	
Machine and locomotive works.....	45.3 per cent
Kali and salt works.....	59.1 per cent
Gasworks.....	60.9 per cent
(Of the allowance, which was again based on 80 per cent of their prewar consumption.)	

At this time, agriculture suffered most of all industries from the dearth of coal. In many parts of eastern Germany a great area of land could not be tilled because no coal was procurable for steam plowing. In east Prussia nearly one-third of the land has not been plowed, and, could not be tilled last autumn so that at best only the spring sown crops of lower yield can be cultivated. On the fertile island of Rugen 25 to 30 per cent of the 1918 grain crop has not yet been threshed for want of fuel.

FUTURE MINING PLANS PROPOSED

It has been proposed that the 8-hour day should be resumed forthwith, and 25 per cent higher pay given to the miners during the winter in order to secure the coal required. The men's representatives have refused these terms, but it is possible the promise of a 6-hour day two years hence may lead to the acceptance of the 8-hour day now. Another suggestion to encourage the men to further work is that a premium should be granted so that if a man received 50 marks per day for producing two tons of coal per day he would receive a premium of 20 marks for an additional half ton, and 30 marks for the next half ton. Others recommend that the minimum wage now payable to a miner, even if he practically does no work, should be reduced by 30 to 50 per cent, so as to make him work and that unemployed pay should be abolished, or be confined to the supply of one hot meal daily at some institution.

Galvanized vs. Blue Sheet Iron Chute Linings

BY DEVER C. ASHMEAD
Tarrytown, N. Y.

IT HAS been the custom for a number of years to use blue-annealed sheet iron, black sheet iron, or common sheet iron as it is variously called for chutes or chute linings in the breakers, tipples, washeries or the rooms of the coal mines, particularly in the anthracite regions of Pennsylvania but to a less extent in the bituminous coal fields. This sheet iron is also used for linings of pockets so that either the pocket will not wear so rapidly or when the surfaces are of slight inclination the coal will slide easier and at a less angle.

This sheet iron is a great help in the handling of the coal but it often causes delays especially in the morning by the coal sticking, requiring the miners or their helpers to push or "buck" it out of the way. This same trouble occurs in the breaker and during the first hour or so in the morning considerable difficulty is encountered because of the chutes clogging requiring men to maintain strict watch to keep them clear. After an hour's run this trouble generally ceases and no difficulty is encountered throughout the day.

This trouble arises from the rust forming on the sheet iron when standing over night and until this rust is removed by the action of the coal passing over and polishing the surface the coal is liable to stick and hang. New sheet iron gives better results than old, no matter how well it may be polished. This is because of the fact that as the sheet iron is used the continual rusting and polishing eats a series of small pits into the metal and these pits have a retarding effect on the particles of coal, of course they only directly affect the fine coal but this in turn affects the larger grains, and as a result there is a tendency to retard the general movement of the coal.

During the war the Trevorton Colliery Co. at the Katherine Colliery near Shamokin, Pa., had considerable difficulty in procuring sheet iron for use in the mine. As a result George H. Jones, the general manager, finding that he could secure galvanized sheet iron, purchased one ton for trial purposes. As a result of this trial this firm has been using the galvanized iron for a period of two years with excellent results and has entirely abandoned the use of the old plain sheet.

This company found that the new iron did not rust and that coal slid just as well in the morning as it did at any other time of the day. Because of this non-rusting galvanized sheets do not pit and therefore there are no minute depressions to retard the fine particles of coal. By actual tests the coal company claims that it was found that coal will slide on an angle of 8 deg. less pitch on galvanized sheet iron than it will be on blue-annealed sheet iron.

The pitting of the blue-annealed sheet iron has another effect besides retarding the passage of the coal. The pit immediately makes a point of attack for wear since it is a thin spot in the sheet. The retardation of the coal by the pits has a tendency to cause a grinding action on the iron at this point and as a result a hole extremely small in size is formed. Possibly hundreds of these minute holes are formed close together and as a result the wear soon connects them and the sheet is worn out.

With the galvanized sheet iron this tendency to wear in the same manner as the blue iron does not exist. The galvanized iron does not rust and as a result, rust does not cause pits and therefore points of intensified wear. Galvanized iron of course wears but its wastage is even and not concentrated as is the case with the blue annealed sheet iron.

ADVANTAGES OF GALVANIZED SHEET IRON

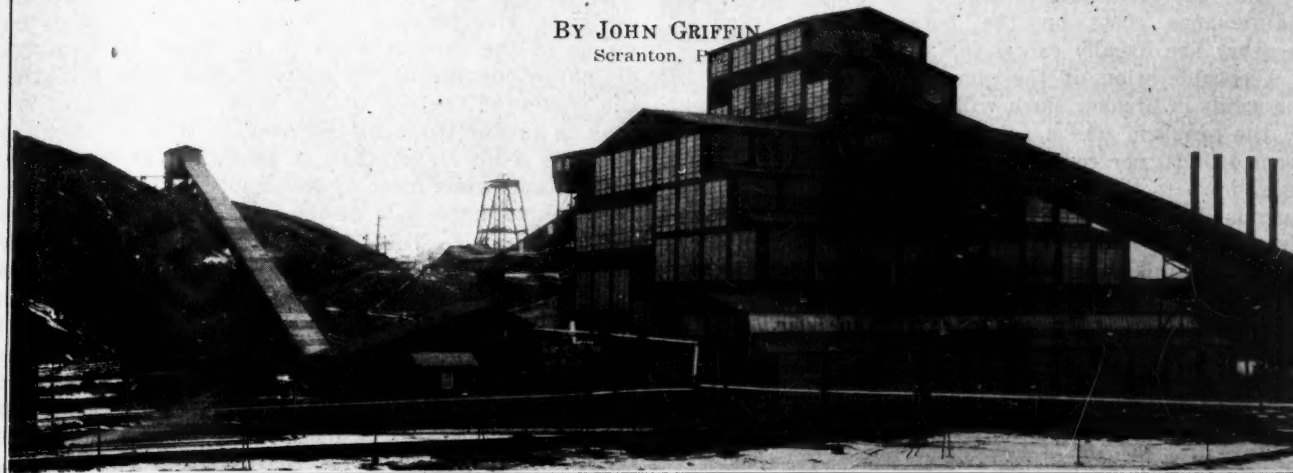
A further proof as to what advantage the use of the galvanized sheet iron has over other kinds is shown by the figures the Trevorton Colliery Co. has compiled. During the year 1916 it used 53,000 lb. of the blue annealed sheet iron and in 1917 it used 30,000 lb. of galvanized sheet iron. In 1917 the production of coal was 33 per cent greater than in 1916 and the use of sheet iron was 43 per cent less. This shows an actual saving of about 40,000 lb. of iron.

From the above the following conclusion may be reached: That galvanized sheet iron is better for use in mines and breakers than blue-annealed sheet iron because coal will slide upon it at a lower angle; chutes will not clog; it will not wear out as rapidly since pitting will not take place; it wears out evenly and slowly giving a longer life.

As a result of two years use of galvanized sheet iron at this colliery a number of other operators are beginning to use it instead of the old blue sheet iron.

Slush Breaker and Mine-Water Problems

BY JOHN GRIFFIN
Scranton, Pa.



SYNOPSIS — *Breaker or washery slush is now a nuisance and in most cases represents an actual waste. Breaker water is often a source of no inconsiderable expense. Much of the coal in the slush can be recovered and the water clarified by means of suitable apparatus. Mine water may also be made available for breaker use. A source of additional output and profit is thus made available.*

IN THE anthracite-coal region wet methods of preparation have been almost universal. In the so-called Middle and Southern fields they have for years been used and now the Northern field has almost entirely adopted them.

The enormous quantity of water required for wet preparation of anthracite is indicated when it is realized that a breaker shipping 2,000 tons per 8-hr. day requires about 2,000 gal. per minute of water or 4,000 tons per day. To obtain this quantity of water is often a problem and the disposal of the waste water or slush in such manner as to prevent stream pollution presents many difficulties.

The gradual extension of the mines has caused a constant increase in the volume of mine water made, most of which must be pumped. According to the reports of the mine inspectors of Pennsylvania for the year 1916, approximately 600,000 gal. per minute of water was pumped from the anthracite mines. Almost invariably the pumping load is continuous for 24 hr. per day, which means that 3,500,000 tons of water must be handled per day. The extension of the mined area has also had a decided effect upon the character of the mine water. The oxidizing action of air on ground waters in mine workings, active and abandoned, results in the formation of free sulphuric acid and soluble acid sulphates. Any appreciable quantity of these produces a water extremely corrosive upon metals and destructive to vegetation. The extension of mine workings increases the production of these corrosive agents and as a result mine waters tend to grow more and more corrosive, increasing their menace as a pollutant and,

Paper presented before the October meeting of the Engineers Society of Northeastern Pennsylvania.

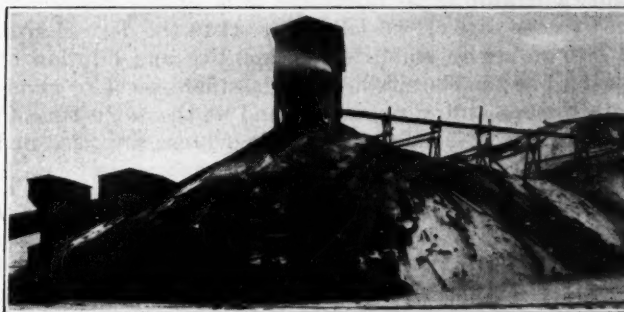
when used for washing coal, increasing the maintenance cost of breaker equipment enormously.

It will perhaps be of interest to take up these problems separately, analyze the situation and point out the results of the latest steps toward handling these problems most effectively and economically.

Breaker slush at present is a nuisance and source of expense to the coal companies, whereas it should be a source of additional revenue because of its large content of coal which can be recovered and made available for industrial or domestic use. An extended study of the problem shows that an increased recovery amounting to from 3 to 5 per cent of present production is easily possible. Fully 3,000,000 tons per year can be added to anthracite production from the same mine output. This does not include additional tonnage that can be recovered from culm banks.

POTENTIAL VALUE OF SLUSH RECOGNIZED

The coal companies, recognizing the potential value of coal wasted in slush, and desiring to reduce pollution of streams to a minimum, have endeavored to retain as much of the solid contents of slush as possible in settling ponds or by back filling underground. The settling pond proves an inefficient expedient since the retained solids



STOCKPILE OF DORR FINE COAL

are generally unfit for use, without preparation, and the water discharged still carries large quantities of fine solids which pollute the streams. Back filling with slush is generally uneconomical as the cost of operation is not warranted by the solids retained.

Settling tanks, consisting of a bucket elevator partially submerged in a tank, or a slow moving conveyor

line working in a trough are in operation and furnish a partial solution of the problem. In these machines no attempt is made to recover all the solids, and the size of the recovered coal cannot be definitely controlled. Maintenance costs on the bucket-elevator type of recovery are usually excessive.

A consideration of the quantities and character of the solids in breaker slush will throw considerable light on the problem. As a rule the total solids amount to from 4 to 10 per cent. They vary in size from steam sizes down to the finest slime. An ash analysis of the various-sized solids shows that generally the coarser sizes are reasonably low in ash, or mainly coal, while the ash content increases with decrease in size.

It will be noted in Table 1 that, generally, the ash content increases markedly in the material finer than 100 mesh. It is often possible to obtain a product relatively low in ash by recovering only the plus 100 or plus 60 mesh material. If not, the impurities in these sizes can be removed easily and cheaply, which is not the case with the material finer than 100 mesh. Thus generally from 40 to 60 per cent of the solids in slush can be recovered as a fuel of relatively low ash. As a rule the balance of the solids must, at present, be considered an absolute waste because of their high ash content. When low in ash they can be recovered for use as pulverized fuel, or they may be briquetted.

The latest development in a plant to recover the fine coal from breaker slush is illustrated in Figs. 1 to 4. This plant is designed to recover the plus 60 mesh coal, without elimination of slate or sand, and with a minimum of undersize; its operation is entirely continuous.

EQUIPMENT USED

The equipment used consists of a Dorr hydroseparator and three Dorr duplex classifiers. The function of the hydroseparator is to reject the bulk of the water and the greater part of the solids finer than the desired size. It also serves to stabilize the quantity and dilution of the feed to the classifier. The classifiers serve to eliminate the remaining fine solids and at the same time to dewater the finished product. No screens are used and in consequence maintenance costs are exceedingly low.

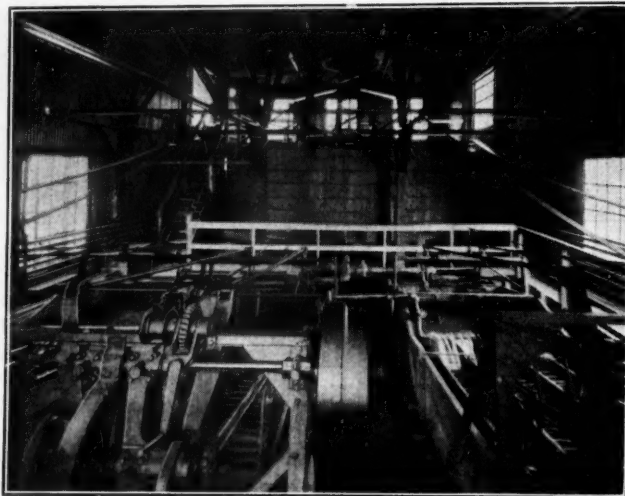
The Dorr hydroseparator consists of a wood tank

with an overflow launder around its periphery at the top and a discharge at the center of the bottom. Suspended in this tank is a mechanism consisting of a central vertical shaft with radial arms at the bottom equipped with ploughs to bring the settled solids by means of the slow rotation in the mechanism, to the discharge opening at the center. The slush is fed at the center of the top of the tank. The area of the tank is proportioned to the average flow of slush, so that the solids larger than 60 mesh fall to the bottom of the tank while most of those smaller than 60 mesh, together with the bulk of the water, overflow the edge of the tank. The overflow may either go to waste or be clarified for reuse, as described later. The underflow, containing the coarse solids, is controlled by a suitable valve by means of which a any desired proportion of water and solids may be maintained. The operation of the separator is not materially affected by the wide variation in rate of flow usual with breaker slush. The separator can be designed to make a sizing split either coarser or finer than 60 mesh.

The Dorr classifiers receive the pulp discharged from the bottom of the

separator and complete the removal of the water and of material smaller than 60 mesh. The classifier consists essentially of a settling box or tank in the form of an inclined trough open at the upper end and equipped with mechanically-operated reciprocating rakes which remove the coarser material as fast as it settles onto the bottom of the tank, the water and finer solids overflowing at the closed lower end. The tank is set at a slope of 2½ in. to the foot for a 60-mesh split.

The rakes are made up of angles attached to the bottom flanges of two channels placed on edge. The construction of the rakes is similar to that of a ladder, and they are carried by suitable hangers from bell cranks connected by rods to levers which terminate in rollers. These latter press against cams attached to the crank shaft, which is driven by belt through a counter shaft and spur gears. The rakes are lifted and lowered at the opposite ends of the stroke by the action of the cams. The horizontal motion is produced by cranks and transmitted to the rakes by connecting rods. The motion imparted to the rakes is, therefore, a forward stroke along the bottom of the tank toward



INTERIOR OF DORR COAL RECOVERY PLANT

TABLE I. PER CENT ASH ANALYSES OF VARIOUS SIZES OF COAL IN SLUSH

Mud screen used..... Per cent total solids.....	Minersville ★ in. round 8.04				Shenandoah ★ in. round 8.58				Wilkes-Barre ★ in. round 5.00				Scranton ★ in. round 3.86			
	Size	Ash	Ash Cumulative	Size	Ash	Ash Cumulative	Size	Ash	Ash Cumulative	Size	Ash	Ash Cumulative	Size	Ash	Ash Cumulative	Size
+ 20 mesh, per cent.....	7.7	26.2	26.2	20.0	20.9	20.9	1.3	19.2	19.7	19.7	10.8	19.5	19.5	19.5	19.5	19.5
- 20 + 40 mesh, per cent.....	9.6	29.8	28.7	...	24.6	22.8	17.0	...	...	...	26.8	21.5	21.4	21.4	21.4	21.4
- 40 + 60 mesh, per cent.....	12.4	30.8	29.7	21.5	29.5	24.1	21.9	28.0	22.8	14.6	18.2	35.1	26.9	26.9	26.9	26.9
- 60 + 100 mesh, per cent.....	3.5	29.9	29.8	10.0	50.1	36.7	40.6	31.5	31.5	39.6	24.9	40.4	26.4	26.4	26.4	26.4
- 100 mesh, per cent.....	66.8	46.1	41.3	48.5	...	...	...	...	...	...	...	...	...	...	...	...
Daily recoverable tonnage, tons.....	30				130			180			95			95		
Ash content, per cent.....	29				25			23			27			27		
Daily breaker shipments, tons.....	1000				2300			4200			2500			2500		
Recovery as per cent of present shipments	3.0				5.6			4.3			3.8			3.8		

the upper discharge, a lift of the entire rake at the end of the stroke, a return stroke in the elevated position, and a lowering to the initial position at the end of this stroke, thus completing the cycle of movement.

The classifiers used are duplex, that is, they consist of two rakes operating in parallel in the same tank. The rakes are arranged to alternate in such manner that the weight of the moving parts is largely counter-balanced and the power required is only that necessary to overcome friction and advance the settled solids. The design is such that all bearings are well removed from exposure to the material treated.

The feed is delivered to a trough across the tank toward the lower end, where the water forms a pool

to recover the plus 60 mesh material with a minimum of undersize. The product recovered averages between 150 and 160 dry tons per day and carries about 15 per cent undersize, and 22 to 26 per cent of ash. The product is delivered to the stock pile with 35 to 40 per cent moisture which drains down in a few hours to 15 to 18 per cent moisture. The loss of plus 60 mesh material is low. The plant is operated by one man and driven by a 10-hp. motor. At present capacity, and allowing 20 per cent fixed charges of which 10 per cent covers amortization of plant, the first charges per ton of product amount to 7 to 8 cents. Three months of operation have shown no maintenance expense. The plant will handle nearly double the present tonnage, as it was designed to treat slush made through a $\frac{3}{8}$ -in. round screen.

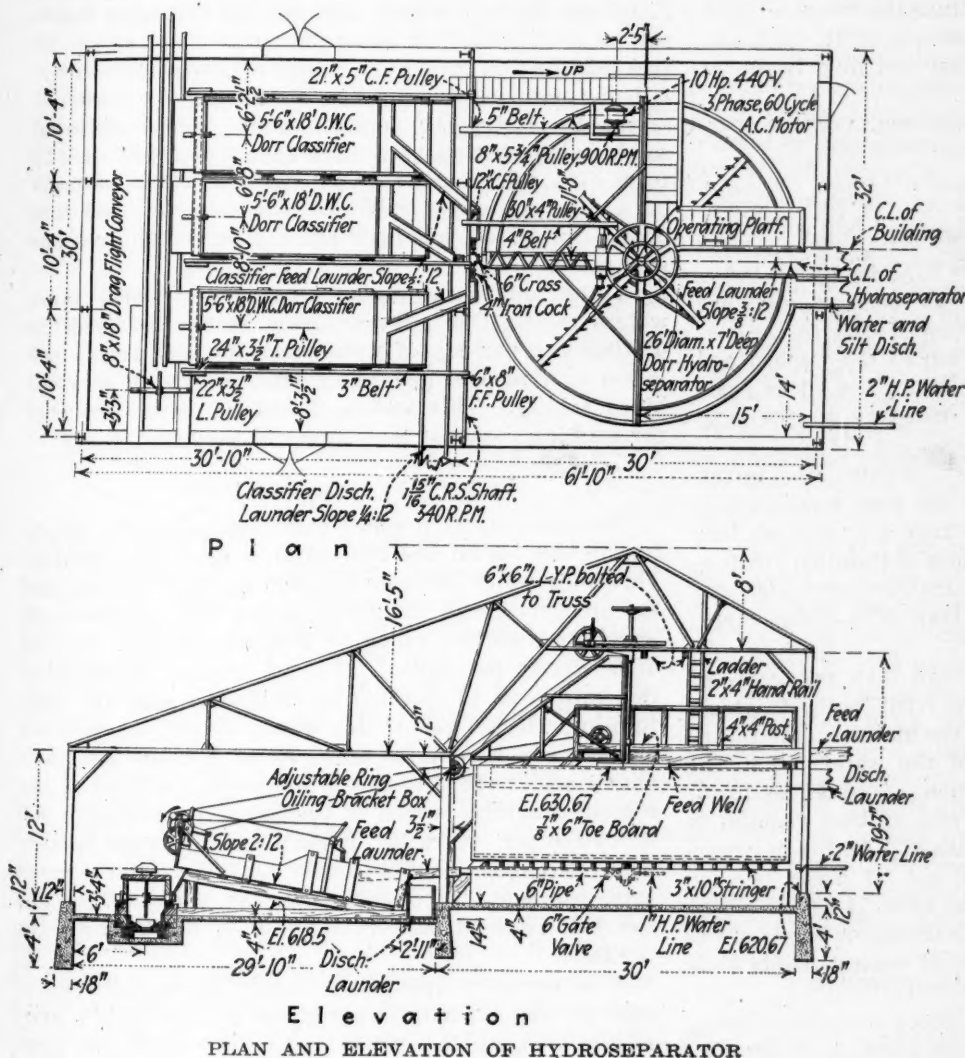
Where it is desirable to obtain a product relatively low in ash some sort of wet concentration device must be used. Operating experience in the bituminous fields and tests run with anthracite slush indicate that the concentrating table, similar to that used in lead, zinc and copper concentration, offers the most advantages. Adjustments of the table allow a wide range of products. In general the loss of coal in the refuse increases as the ash in the finished product is reduced. Test runs with this device indicate a capacity of 4 to 6 tons per hour and a coal product as low as 10 per cent in ash, if desired. Usually 15 to 18 per cent ash is satisfactory and in such case the waste product will analyze between 65 and 75 per cent ash, giving only a small loss of coal in the process.

The concentrating tables are installed between the hydroseparator and the classifiers, the latter machine thus treating only the coal product from the tables. Any pyrite contained in the slush can be recovered in the same operation.

Operation in the soft coal fields indicates that 10 cents per ton will cover tabling costs.

The recovery of fine coal, plus 60 to 100 mesh, as a usable fuel removes about one-half of the solids which would cause pollution. The recovery of the balance in the form of a thick sludge which can be stored easily is possible at relatively little cost for equipment and operation. At present between 3,000,000 and 4,000,000 tons of such material are discharged each year from breakers and washeries in the anthracite region.

The equipment available for this recovery is the Dorr thickener. Its arrangement is identical with the Dorr hydroseparator already described. By simply enlarging the area of the tank, the settling velocity of the slush is so reduced that practically all of the suspended



PLAN AND ELEVATION OF HYDROSEPARATOR

which extends only part way up the sloping tank bottom. The granular solids settle through the pool and are advanced up the inclined bottom of the tank by the rakes. After emerging from the pool and while ascending the sloping bottom the solids have an opportunity to drain before being finally discharged from the upper end of the tank. In this case, the material minus 60 mesh overflows the closed end with the water. The classifiers can be adjusted to make a separation either finer or coarser than 60 mesh.

This plant is handling from 3,500 to 4,500 gal. of slush per minute made through a $\frac{3}{8}$ -in round screen and containing 5 per cent of solids or a total of 360 tons of solids per day. The ash content of these solids average from 30 to 32 per cent. The plant is designed

solids settle to the bottom and the water overflows the edge of the tank clear or only slightly turbid. Such thickeners in sizes up to 200 ft. in diameter are in operation in other industries. The tank can be constructed of wood, steel or concrete as proves most advantageous.

In the bituminous fields this system is now being introduced. Practice in this field is referred to in a paper by J. R. Campbell, presented at the Chicago Meeting, September, 1919, of the American Institute of Mining and Metallurgical Engineers; also by Ernst Prochaska in his paper on "Preparation of Bituminous Coal," VI., in *Coal Age* of July 3, 1919.

At the washery referred to, which has a capacity of 4,000 tons of raw coal per 16 hours, two 70 ft. diameter Dorr thickeners were installed to take the overflow from the washed-coal settling basin, and one 50 ft. thickener for the overflow from the refuse settling basin of wasted coal.

Mr. Campbell gives the following results on the operation of the two 70 ft. thickeners:

	Influent	Effluent	Underflow
Water, per cent.	98.0	99.7	47.2
Solids—coal, per cent.	2.0	0.3	52.8
Specific gravity, per cent.	1.0052	1.0008	1.1580
Total per cent.	100.0	97.0	3.0
Tons per hour	500.0	485.0	15.0

The underflow carrying 47.2 per cent of moisture is either fed with the coarser washed coal to the mechanical dryers, or delivered on top of the washed and dried coal going to the coking plant. The latter practice adds about 3 per cent of moisture to the final washed product.

Since Mr. Campbell's paper was written, the installation of a third 70 ft. thickener has been completed.

The three coal thickeners now take a total slush feed amounting to 6,150 gal. per minute containing 275 tons of coal per day. Of this there are recovered 269 tons per day or 97.87 per cent in the form of a sludge carrying 48 per cent moisture.

The overflow carrying less than 0.15 per cent. of solids, together with the overflow from the 50 ft. thickener, is returned to the washery circulation. This return constitutes 98 to 99 per cent of the water fed to the thickeners. The net consumption of water exclusive of evaporation, plant leakages, etc., is thus reduced to 40 to 45 gal. per ton of coal washed. Anthracite practice requires approximately 480 gal. of water per ton of finished coal when the breaker slush is run to waste.

In the anthracite fields no such thickener plants are as yet in operation, but tests made at several plants show the following possibilities:

Volume to be treated, gal. per minute	1,500
Solid content, per cent.	1.3
Size of thickener—ft. dia.	72
Solids in overflow, less than, per cent.	0.03
Removal of solids, per cent.	98
Recovery of water, per cent over	95
Sludge, gal. per minute	55
Dry solids per day, tons	35
Cost of thickener plant, complete	\$10,000 to \$12,000
Direct annual operating costs	\$500 to \$600
Annual fixed charges at life of 15 yr.	\$2,000
Operating cost per gal. of water recovered	1½c.

MINE WATER TREATMENT

Of the total of 600,000 gallons per minute of mine water pumped, no data are available as to the quantity which contains an excessive amount of sulphuric acid and acid sulphates. Although the mining companies appreciate the expense entailed by the use of such water in preparing coal, their efforts have been directed toward obtaining supplies of good wash water rather than development of methods to purify the mine water.

That much mine water is of a corrosive nature is well

recognized. It would appear that more such water is produced in the Middle and Southern fields than in the Northern field.

It is well known that all the free acid and most of the acid sulphates may be removed by treatment of the water with finely ground limestone or milk of lime. The free acid is precipitated as calcium sulphate, while the reaction with the acid sulphates precipitates both calcium sulphate and iron and aluminum salts.

The precipitate is bulky giving a dirty water and one that will produce rusty-looking coal unless the solids are removed.

That such treatment of mine water is feasible has been demonstrated at one of the large coal mines in the Pittsburg district, where 1,250,000 gal. of mine water per 24 hr., containing about 30 grains per gallon of free acid and 60 grains per gallon of combined acidity, is being regularly treated. A 70 ft. diameter thickener serves to clarify the treated water, the precipitated solids being continuously collected and removed in the form of a thick sludge. The clarified water contains but a few grains per gallon of acid sulphates and suspended solids, and has little effect upon piping or other iron parts.

In the anthracite region some much worse mine waters exist. One mine pumping station is handling 430,000 gal. per day of water carrying 130 grains per gallon of free acid and 140 grains per gallon of combined acidity. This water, of course, cannot be used for washing coal, but goes direct to the river.

TYPICAL REGIONAL SITUATION

The following is perhaps more typical of the situation in this region and this water is used in a breaker. This mine water amounts to 1,300 gal. per minute, and the analysis shows 29 grains per gallon of free acid and 39 grains per gallon of combined acidity, a total of 68 grains per gallon. It is of interest to see what this means as to quantity of sulphuric acid per day. In 8 hr., 624,000 gal. of this water are put through the breaker which contains 2,500 lb. of 100 per cent sulphuric acid. Added to this is the corrosive effect of the combined acidity, which is equivalent to another 1,000 lb. of 100 per cent acid. Eight tons of storage battery acid (electrolite) contains about 3,500 lb. of 100 per cent sulphuric acid. In other words, the equivalent of one ton per hour of battery acid is going through the breaker.

This corrosive agent can dissolve about 1,400 lb. of iron per day. If only 5c per pound is taken as the price of the iron, \$17,000 worth can be consumed per year. The assistant general manager of the company operating this breaker estimates that the extra breaker maintenance cost due to the acid water amounted to roughly \$20,000 annually.

The cost of plant to treat this water will be about \$10,000. Direct operating costs would be about \$4,000 annually, of which lime accounts for \$2,000. The total cost per 1,000 gal., including liberal fixed charges, is about 3½ cents.

BREAKER WATER SUPPLY

It will be seen that the clarification of slush besides solving the pollution problem offers a source of water suitable for breaker use at little expense—from 1c to 2c per 1,000 gal. In many cases breaker water can be obtained only by pumping from considerable distances against high heads, and sometimes in case of drought,

can be obtained only by purchase from water companies at considerably in excess of 2c per 1,000 gal. In such cases, clarification of breaker slush would be justified by the water-supply cost only.

In conclusion a brief summary of the universal application of these processes to the entire hard coal region will indicate the comparatively small investment required for the benefits obtained.

The recovery of fine coal would produce upwards of 3,000,000 tons annually of high grade anthracite that can be converted into a fuel for either industrial or domestic purposes. The investment cost would amount to only about \$3,000,000 for the entire region. The product certainly would be worth 50c per ton at the mines and, at this figure, the coal companies could make 15c a ton profit as a minimum.

If this fine coal were briquetted it would add 8 per cent to the domestic anthracite production. The market for briquets as a domestic fuel is gradually being established. Briquets can be sold at about the prices of pea coal and would in this case yield a net profit of 50c per ton. The investment for briquetting plants to handle this 3,000,000 tons of recoverable coal would be about \$10,000,000.

At the present time the investment in the anthracite industry per ton of annual production averages about \$8. This combination of fine coal recovery and briquetting shows less than \$5 investment per ton.

Industrial Unrest and Its Cure

BY JACK L. BALL

WILL 1920 prove to be a banner industrial year, or will it be one of sabotage, strikes and discontent? Conservative minds are moving heaven and earth, as it were, to discover a panacea for the present industrial unrest; radical leaders—spurious to the core—are busily devising ways and means in an attempt to destroy the sane and logical ideas that are advanced for the good of all the people.

The basic industries of the United States are so closely co-ordinated that when the production of one is lessened it ultimately affects, through reaction, not only the employers or employees of that particular industry, but the whole population of the land.

As citizens of the United States we are granted the privilege of life, liberty and the pursuit of happiness. If we are good citizens, we should see that these three privileges are enjoyed by our neighbor as well as ourselves. We are fully agreed that every man has the right to benefit in the fullest measure possible from his labor, but no man or group of men should be accorded the power to exact a wage higher than his or their actual earning capacity warrants. When this occurs one group profits at the expense of the others.

Money is a necessary and essential commercial medium. We can exchange it for those commodities which bring to us and our families the pleasures that the world has to offer. Moreover, it should be a pleasure for a man to labor if he expects something in return that he can utilize in a beneficial way. If our work is a task and we cannot enjoy it, we should find a pleasure in the beauty or usefulness of that which we produce and in the ultimate pleasure that it will bring to others. It is becoming more apparent, however, that we are asking for a beautiful and bountiful harvest without the necessity of planting the seed; asking the other

fellow to give his fullest measure so that we may secure something for nothing.

People have acquired a kind of madness in their attempt to buy all the luxuries—not actual necessities—that can be produced. The war with its super-demands and abnormal wages is, in a measure, responsible for this condition of affairs. With the cessation of hostilities it was thought that people would drift back to their former mental equilibrium of pre-war days, but the reverse is true. The universal idea is to demand and exact wages without proportionate production. John Smith proved the fallacy of this Bolshevik principle at Jamestown three hundred years ago, proved it false because it conflicted with economic law.

Panics began in the United States in the first quarter of the 19th Century and have occurred with astonishing regularity ever since. Soap-box orators assert that panics—call them hard times if you wish—are caused by over-production. Well-informed men maintain exactly the opposite and say that prices are due to under-production and the resultant price inflation. If the prevailing thoughts in the minds of the workers continue in the same channel as now, the business and industrial world will not be stabilized except by a gradual upbuilding after the crash that is certain to come. And this panic that the country is facing cannot be blamed upon over-production.

If the men and women workers of the United States would put forth their individual maximum efforts for 90 days, the prices—not wages—of the necessities of life would take a slump such as legislation could not effect in five years.

Employers and employees have always misunderstood each other. Russia has proved to us that capital and labor depend directly upon each other. When these two powerful factors of our economic life are bound together by the link of mutual understanding, and when all men are willing to perform an honest day's work for an honest day's wage, than, perhaps, a universal remedy will have been found for our present and demoralizing industrial ills.

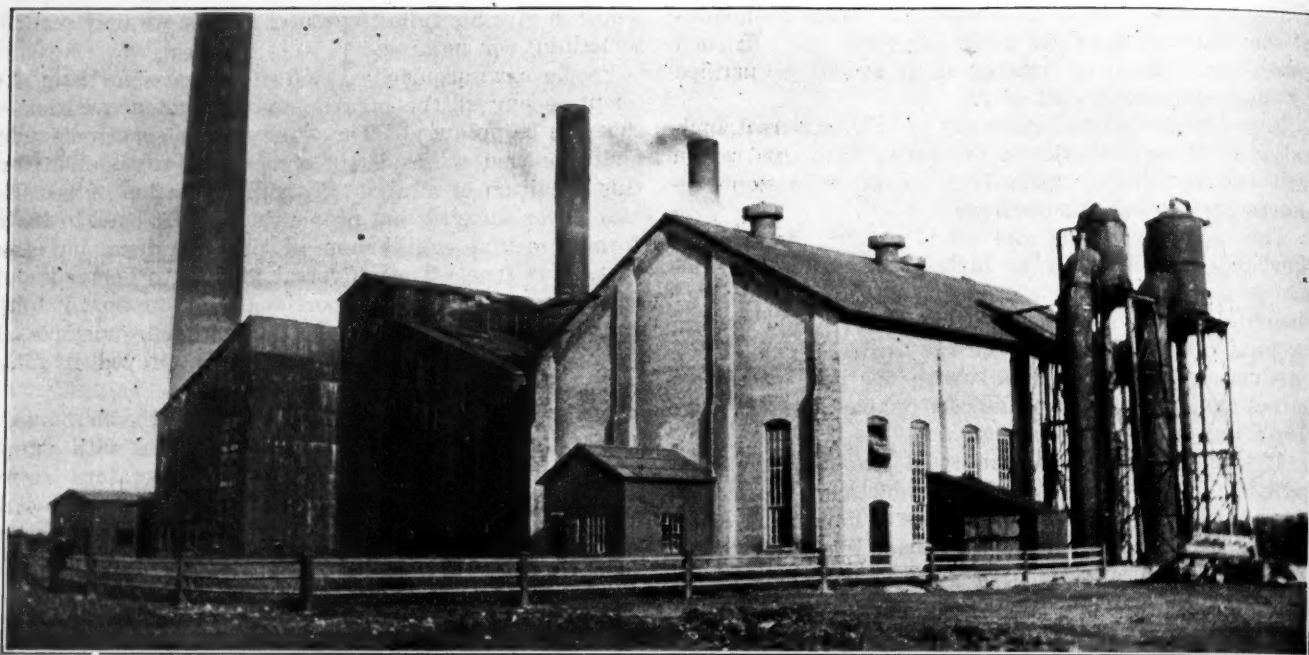
Let us put into the discard the bitter feelings of both the past and present and employ in their stead those new standards of benevolence, which the war has given us, so that we may effectively combat the common enemy of the human race, industrial unrest.

Philadelphia Retailers Protest

Confiscation is again becoming general, states the National Retail Coal Merchants' Association in a letter to its members, and not only that but diversions are being made from retail merchants to manufacturing plants. There is of course a great chance for the playing of favorites.

They advised the retail coal trade to have recourse in every case to the only remedy available, namely "that which we advised the Director-General we were going to follow. We stated to him that claim would be filed for all coal taken, whether confiscated for railroad use or diverted from retail consignees, covering in addition to all general damages, all special damages, including the following:

- Loss of profits.
- Increased cost of doing business.
- Damages for loss of or interference with business, or by delaying or preventing delivery of fuel to consumers.
- Causing breach of contract by the retailer to supply fuel.
- Injury to reputation of business and character of service, etc.



Waterford Lake Power Plant of the Dominion Coal Co.

BY FRANK H. KNEELAND
Editorial Staff, *Coal Age*

DURING the past few years much interest has been manifested in the application of pulverized coal to power purposes. This fuel unquestionably possesses certain obvious advantages while as experience has shown its use also involves equally obvious disadvantages. Among the former are usually claimed perfect and smokeless combustion, high efficiency, and great flexibility. The disadvantages include considerable complication of machinery, the expense of drying and pulverizing the fuel, and usually a high upkeep charge entailed by the intense local heat generated.

Although it has long been known that coal pulverized to a sufficient degree of fineness would burn while suspended in air, practical application of this principle has only been made during comparatively recent times. Pulverized fuel has been successfully applied to cement burning of several years and to metallurgy and steel manufacture (e.g. the open hearth furnace) for a shorter period. Its application to steam generation involves several problems not encountered in the processes above enumerated and unless special attention is here given to furnace construction, difficulties arise.

The secret of successfully burning powdered fuel in steam-boiler furnaces appears to lie in providing sufficient combustion space within the furnace to insure complete combustion of each coal particle before it shall leave the furnace or come in contact with the comparatively cold boiler surfaces. Various expedients have been resorted to in order to secure this result.

One of the first boilers to successfully use powdered coal was the Bettington. This boiler had its origin in South Africa, and was designed especially to burn this fuel.

Briefly the Bettington boiler consists of an annular mud drum connected by water tubes to a compound upper drum. This upper drum is made up of a central portion or drum proper surrounded by and connected with an annular ring into the lower surface of which the above mentioned water tubes are expanded. The tubes are thus arranged in the form of a skeleton cylinder open at the bottom. Special fire

This is believed to be the only coal-mine power plant in America burning powdered coal under Bettington boilers. The fuel arrives at the plant as slack and is ground when and as needed. One of the advantages of these boilers is the rapidity with which steam can be raised.

brick with a U-shaped cross section straddle the tubes and extend from the upper or steam drum to within two or three feet of the lower or mud drum and form the furnace of the boiler. Pulverized coal and air are blown through a water-jacketed nozzle placed in the centre of the lower end of the cylindrical furnace. The burning fuel thus passes upward through the centre of the furnace, turns outward and moves downward to the lower end of the fire brick baffle or furnace lining. The products of combustion here again turn outward and move upward between the boiler tubes and through the superheater to the breeching or uptake. The whole boiler is, of course, incased with a suitable jacket.

The Bettington boiler is by no means a common type of steam generator in America. While a few have been imported and installed it is believed that only

one coal-mine plant West of the Atlantic generates current from steam raised in these boilers fired with powdered coal. A description of this plant will, therefore, doubtless be of interest.

The plant in question is located on the shore of Carney Lake about 8 or 10 miles from the town of Glace Bay, Nova Scotia. It is the property of the Dominion Coal Co., and is known as the Waterford Lake Power Plant. It is not at or in close proximity to any coal mine and fuel is shipped to it in railroad cars. The lake furnishes an abundant and cheap supply of water, which was probably the reason for placing the plant where it is. Current here generated is transmitted to and is consumed at various coal developments throughout the mining region of which Glace Bay is roughly the centre.

As may be seen in the accompanying illustration, the plant consists primarily of two buildings in close proximity to each other. One is a frame and corrugated iron structure and houses the boilers while the second is of brick and contains the turbines, generators and auxiliary equipment.

In the boiler house four stoker-fired 500 hp. B & W boilers are installed on one side of the central alley. They are equipped with economizers and superheaters. On the opposite side of the building stand four Bettington boilers each 18 ft. in diameter and 26 ft. high, the tubes being 20 ft. long. Each of these boilers has a rated capacity of 20,000 lb. of steam per hour. These boilers also are provided with economizers and superheaters as well as having air heaters in the breeching or uptake through which the air blast is drawn and heated prior to passing to the furnace nozzle. Steam is normally carried at 180 lb. gage pressure and 150 deg. superheat.

HOW COAL IS BROUGHT TO THE BOILERS

Coal is brought to the plant in railroad cars and dumped into a hopper. From here it is taken by a bucket conveyor and delivered into the overhead bunkers in the upper portion of the building. Downcomer pipes from the bunkers lead the coal to the hoppers of the Taylor stokers serving the B & W boilers and to the hoppers of the beaters or pulverizers grinding the coal for the Bettingtons.

Four pulverizers are installed or one for each powdered-coal boiler. Any two of these machines will however run all four of the boilers. These pulverizers are combination machines—they not only grind the coal but furnish the blast by which the fuel is carried to the so called carburetter and subsequently to the boiler furnace. In the carburetter the fine coal is screened, the coarse particles being returned to the pulverizer while those of suitable fineness are sent to the boiler. Two of the pulverizers are driven by 35 hp. 550 volt motors running at 1,500 r.p.m. The other two pulverizers are driven by steam turbines.

One stack is provided for each two Bettington boilers. This is placed directly above the economizers in the rear of and between the boilers.

The pipes carrying fuel from the pulverizers to the furnaces are of sheet iron and about 12 in. in diameter. The orifice in the fuel nozzle is 9 in. in diameter.

In addition to the equipment above described the boiler house contains two vertical Weir and one Terry feed pumps. Two American Blower Co. fans, direct connected to engines made by the same firm, supply draft to the Taylor stokers.

In the power plant or generator room proper the following machinery is installed: One Rateau horizontal steam turbine, direct connected to a Siemens Bros. 2,500 kv. 6,600 volt, 273 amp. 3 phase 25 cycle generator. This unit operates at 1,500 r.p.m. One General Electric horizontal turbine direct connected to a 2,000 kw. 6,600 volt, 195 amp. 1,500 r.p.m. G. E. generator. These two machines operate in synchronism with each other and in parallel with two other power plants about 15 miles distant also owned and operated by the Dominion Coal Co.

ABUNDANT EXCITING CAPACITY FURNISHED

Two exciter units, Siemens Bros. 45 kw., 110 volt, direct current, shunt field generators, are joined by a flexible coupling and driven, by a Belliss & Morcom engine at 525 r.p.m. Another exciter unit consists of a Canadian Westinghouse 75 kw. 125 volt generator driven at 290 r.p.m. by a direct connected 12 x 12 in. Ideal engine made by the Goldie & McCulloch Co., of Gault, Ont.

An eight-panel switchboard provided with all necessary switches and instruments is installed in one end of the generator room. A 30 ton hand-operated crane spans the building and may be traversed from end to end.

As may be seen in the accompanying illustration, barometric condensers are installed just outside the building. Circulating water is drawn from and returned to Carney Lake. About 28½ in. of vacuum is normally obtained. Under ordinary circumstances the circulating water is handled by a turbine-driven, single-stage centrifugal pump. Two engine-driven centrifugal pumps are also kept as standbys. These machines as well as two vacuum pumps are installed in the basement of the power plant. All steam piping leading to the power units and auxiliaries is also carried in the basement. This relieves the turbine room proper of all piping and makes possible an extremely neat appearance.

As was stated in the beginning one of the chief objections to a pulverized fuel boiler is the high upkeep charge. This has not been entirely escaped in this boiler plant and repairs are frequently necessary to the firebrick furnace lining and to the beaters or pulverizers. On the other hand the Bettington boilers are efficient steam makers and extremely "lively" in starting. With cold water in the boilers at the start a full head of 175 lb. of steam has been developed in them in exactly 25 min. after the fires were lighted.

OVERALL EFFICIENCY OF THE PLANT

An idea of the overall efficiency of the plant may be gained from the fact that power is delivered to the bus bars of the switchboard for 3 lb. of coal fed to the boilers for each kilowatt hour. The coal burned is slack with a heat content of about 13,000 B.t.u. per pound.

The plant above described is under the direct charge of Everett McPherson, a machinist by trade, and a man of wide experience. V. McFadden is mechanical superintendent of the Dominion Coal Co., thus having general supervision over all its mechanical equipment. And since this company is probably the biggest coal producer in Canada and operates many mines in Northeastern Nova Scotia, many of which include submarine areas, it will readily be appreciated that the Waterford Lake Power Plant is only one of several of its generating stations.

West Virginia Accountants Organize

AT a meeting held at the Hotel Farr, Huntington, W. Va., Jan. 30, 1920 a number of accountants who were present organized what is now known as the West Virginia Accountants Association.

The following officers were elected for the fiscal year ending Dec. 31, 1921: M. P. Morris, president and general manager; R. L. Baugham, vice president; H. E. Meadows, secretary; T. M. Bowman, treasurer; J. C. Riggs, director.

The object and purposes of the association are:

1. To standardize the science of accounting, and bring about plenary understanding of theory, practice, technology, terminology, books, forms, files, formulas, rulings, spacing, sizes, weights, colors, binding and references, incident to administration and representation of the affairs of corporations, associations, individuals and the public generally.

2. To co-ordinate the actuarial, statistical and economic experiences of statesmen, lawyers, bankers, chemists, experts, civil and mining engineers, accountants and administration men to the point of common understanding of commercialism, and the fundamental principles of accounting, the elements of cost and component factors thereof.

3. To classify by decimal system of expansion and contraction the assets, liabilities, earnings and expenses of corporations, associations, individuals and the public generally.

4. To perfect and adopt by resolution, uniform standards for balance sheets, financial statements, profit and loss statements, cost sheets, inventories, tax renditions, and all other forms necessary and incident to authentic representation and common understanding of comparisons.

5. To acquire, own and operate all real estate, construction, equipment, other property and investments, necessary and incident to the successful maintenance and operation of the association and branches thereof.

6. To solicit and admit to membership corporations, partnerships and individuals and to charge and collect fees and dues as regulated by the constitution and by-laws of the association.

7. To examine and admit to membership, accountants, auditors, statisticians, economists, secretaries, clerks, stenographers, bookkeepers, cashiers, pay roll clerks, store managers, purchasing agents, civil and mining engineers, experts and efficiency men, foremen, superintendents, managers, officials and directors, and to award certificates as to their proficiency and knowledge of association methods, and to charge and collect fees and dues as regulated by the constitution and by-laws of the association.

8. To practice the profession of public accounting in all of the United States and foreign countries as regulated by the constitution and by-laws of the association.

9. To investigate, examine, audit, adjust, report, and certify the legal, financial and statistical affairs and conditions of corporations, associations, and individuals, and to charge and collect fees therefor as regulated by the constitution and by-laws of the association.

10. To assemble the membership in conventions at stated periods and to provide ways and means for the furtherance of the best interests of the association in

accordance with the statutes, made and provided and as regulated by the constitution and by-laws of the association.

President Morris stated further that the association was not a competitive organization, the nature of the work being mainly a missionary service to the industries, and that the association had an authorized capital of \$10,000.00, the major part of which has been subscribed in order to become legally responsible and to protect the association against malignment and being characterized as a union of bookkeepers, or an employment agency by those without the state, whose desire it is to capitalize the necessities of the industries.

Urges Continuance of Coal Exchange

AT THE annual meeting of the New York Wholesale Coal Trade Association recently held in this city the members voted in favor of a continuance of the work of the Tidewater Coal Exchange. On March 1 when the railroads are turned back to private ownership and the Railroad Administration is dissolved, the Tidewater Coal Exchange is also slated to pass out of existence. Therefore, in view of the large savings which have accrued to those using the pools, efforts are being made by the above association to put the exchange on a permanent basis. Charles A. Owen, chairman of the committee to furnish data concerning the work of the exchange, addressed the meeting and presented very vital figures concerning past history of the exchange, and also of its necessary character to tidewater shippers.

Mr. Owen stated that in nine months from February to October, 1919, the exchange had effected a saving in car demurrage of \$731,462, out of a total of \$1,263,218, figured on the individual shipper basis, or an average of approximately 11c. per ton. Mr. Owen told the members present that through the pooling arrangement a daily average of around 6,000 cars on hand was sufficient to take care of the harbor trade, whereas if we resorted to the old method of every shipper for his own coal, double the number would be necessary to be kept on hand, thereby materially increasing demurrage bills.

A vote was taken and it was unanimously agreed that a committee of seven be appointed to investigate further and adopt a policy to be outlined to members of the trade at a meeting to be held at a later date.

Industrial Safety Codes Discussed

ON DEC. 8 there was held at the Bureau of Standards in Washington a notable conference on industrial safety codes, at which there were representatives of practically all organizations of a national scope interested in any of these wide phases of industrial safety. The conference grew out of an earlier one held on Jan. 15, 1919.

There was a thorough discussion of the whole situation, the consensus of opinion being that there should be a large number of industrial safety codes—perhaps 50 or even 100—developed during the next few years.

Coal Age Index for Last Half of 1919

The index to *Coal Age*, Volume 16, covering the last half of 1919 is now ready for distribution, and will be sent free to anyone addressing a request to the subscription department of *Coal Age*, New York City.

Government Returns For 1919

PRELIMINARY returns on the byproduct coke industry indicate a total production for the year 1919 just short of 25,000,000 net tons.

Compared with the record year, 1918, this was a decrease of 1,000,000 tons or 4 per cent. The decrease was general with the exception of New Jersey, Ohio and Pennsylvania. In the last-named state the completion of new byproduct ovens brought output to approximately 5,750,000 tons, an increase of 25 per cent over 1918. Ohio ranked second with 5,450,000 tons and Indiana, third with 3,560,000.

The year 1919 was a turning point in the history of coke manufacture in the United States. For the first time the tonnage of byproduct exceeded that of beehive coke. In 1918, 46.0 per cent of the total coke output was

made in byproduct ovens, the percentage from beehive ovens being 54.0. In 1919 these proportions were reversed, 56 per cent coming from byproduct and only 44 per cent from beehive ovens.

The rise of the byproduct coke industry from its small beginning in 1893 is shown below:

ESTIMATED PRODUCTION OF BEEHIVE COKE BY STATES IN 1919
WITH COMPARATIVE (NET TONS) FIGURES FOR 1918

	1918 (Final)	1919 (Estimates)
Pennsylvania and Ohio.....	22,276,000	14,861,000
West Virginia.....	2,717,000	1,061,000
Alabama, Tennessee and Georgia.....	2,042,000	1,695,000
Virginia and Kentucky.....	1,535,000	1,201,000
Colorado, Oklahoma, and New Mexico.....	1,401,000	558,000
Washington and Utah.....	510,000	274,000
United States total.....	30,481,000	19,650,000

BYPRODUCT COKE PRODUCED IN 1918 AND 1919, BY STATES, WITH
INCREASE OR DECREASE
(Net Tons)

State	1918 Ovens	1918 Tonnage Produced	1919 Ovens	1919 Tonnage Produced	Increase (+) or Decrease (-) Tons Per Cent.
Alabama.....	847	2,634,451	906	2,255,000	-380,000 -14
Colorado.....	120	(a)	120	(a)	(a)
Illinois.....	626	2,285,610	714	1,705,000	-581,000 -25
Indiana.....	1,026	3,898,215	1,216	3,691,000	-207,000 -5
Kentucky.....	108	517,749	108	408,000	-110,000 -21
Maryland.....	180	474,368	360	356,000	-118,000 -25
Massachusetts.....	400	556,397	400	393,000	-163,000 -29
Michigan.....	269	(a)	389	(a)	(a)
Minnesota.....	220	784,065	220	586,000	-198,000 -25
Missouri.....	56	(a)	56	(a)	(a)
New Jersey.....	260	682,148	315	789,000	+107,000 +16
New York.....	615	1,069,587	591	751,000	-319,000 -30
Ohio.....	1,658	5,226,334	1,608	5,445,000	+219,000 +4
Pennsylvania.....	2,368	4,586,981	2,846	5,747,000	+1,160,000 +25
Rhode Island.....	40	(a)	40	(a)	(a)
Tennessee.....	24	124,469	24	105,000	-20,000 -16
Washington.....	20	30,129	20	28,000	-2,000 -7
West Virginia.....	214	603,393	214	393,000	-210,000 -35
Wisconsin.....	268	(a)	232	(a)	(a)
Combined states(a).....		2,523,684		2,519,000	-5,000 -0.2
Total.....	9,279	25,997,580	10,379	25,171,000	-827,000 -3

(a) Includes Colorado, Michigan, Missouri, Rhode Island and Wisconsin, combined to avoid disclosing operations of individual companies.

BYPRODUCT OVENS IN EXISTENCE AT BEGINNING AND END OF
1919, AND BUILDING JAN. 1, 1920, BY TYPE

Type	In Existence Jan. 1, 1919	In Existence Jan. 1, 1920	Building Jan. 1, 1920
Koppers.....	4,829	5,659	497
Semet-Solvay.....	2,035	2,275	180
United-Otto.....	1,840	1,754	36
Rothberg.....	281	257	...
Wilputte.....	78	206	...
Cambria-Belgium.....	90	60	60
Gas machinery.....	60	60	...
Klöne.....	42	42	...
Roberts.....	24	24	80
Piron.....	...	12	...
Total.....	9,279	10,379	853

ESTIMATED MONTHLY PRODUCTION OF BEEHIVE COKE AND OF
PIG IRON IN THE UNITED STATES IN 1919

Month	Beehive Coke (Net Tons)	Pig Iron (a) (Gross Tons)
1918, monthly average.....	2,540,000	3,586,000
January.....	2,384,000	3,306,000
February.....	1,787,000	2,948,000
March.....	2,091,000	3,088,000
April.....	1,343,000	2,474,000
May.....	1,103,000	2,108,000
June.....	1,148,000	2,114,000
July.....	1,482,000	2,424,000
August.....	1,699,000	2,742,000
September.....	1,755,000	2,481,000
October.....	1,521,000	1,864,000
November.....	1,647,000	2,407,000
December.....	1,690,000	2,630,000
Total.....	19,650,000	30,586,000

(a) Figures for 1918 quoted from American Iron Steel Institute, for 1919, from Iron Trade Review.

BYPRODUCT OVENS UNDER CONSTRUCTION JAN. 1, 1920

Company	Location of Plant	No. of Ovens	Type of Ovens	Probable Date of Operation
Birmingham Coke & By-products Co.....	Birmingham, Ala.	50	Koppers	Mar. 1, 1920
Sloss & Sheffield Steel and Iron Co.....	Birmingham, Ala.	120	Semet-Solvay	Feb. 1, 1920
Tenn. Coal, Iron & R.R. Co.....	Fairfield, Ala.	77	Koppers	Feb. 1, 1920
St. Louis Coke & Chemical Co.....	Granite City, Ill.	80	Roberts	June 1, 1920
Donner-Union Coke Corp.....	South Buffalo, N. Y.	150	Koppers	June 1, 1920
Lackawanna Steel Co.....	Lackawanna, N. Y.	60	Semet-Solvay	July 1, 1920
Cambria Steel Co.....	Johnstown, Pa.	60	Cambria-Belgium	June 1, 1920
Jones and Laughlin Steel Co.....	Pittsburgh, Pa.	60	Koppers	April 1, 1920
Pittsburgh Crucible Steel Co.....	Midland, Pa.	100	Koppers	June 1, 1920
Domestic Coke Corporation.....	Fairmont, W. Va.	60	Koppers	May 1, 1920
Steel and Tube Co. of America.....	Mayville, Wis.	36	United-Otto	Jan. 1, 1920
Total.....		853		

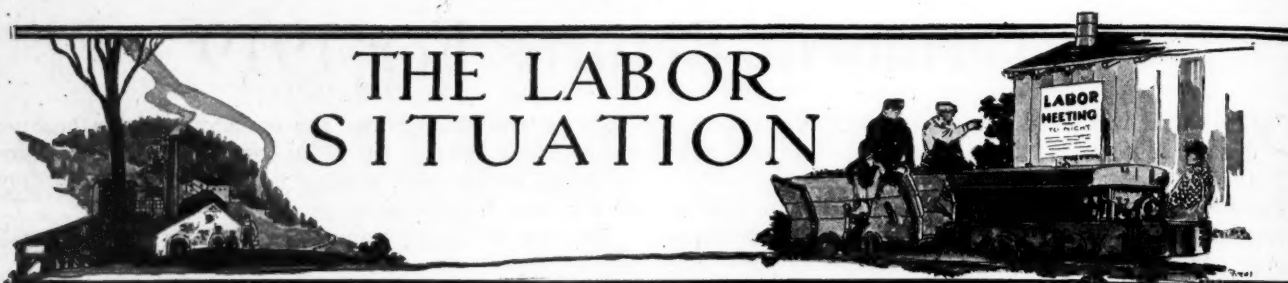
PRODUCTION OF BEEHIVE AND BYPRODUCT COKE IN THE
UNITED STATES, 1893-1919

Year	Byproduct Tons Produced	Beehive Tons Produced	Total Coke	Per Cent of Total Byproduct	Per Cent of Total Beehive
1893.....	13,000	9,465,000	9,478,000	0.1	99.9
1900.....	1,076,000	19,457,000	20,533,000	5.2	94.8
1905.....	3,462,000	28,769,000	21,231,000	10.7	89.3
1910.....	7,139,000	34,570,000	41,709,000	17.1	82.9
1913.....	12,715,000	33,585,000	46,300,000	27.5	72.5
1914.....	11,220,000	23,336,000	34,556,000	32.5	67.5
1915.....	14,073,000	27,508,000	41,581,000	33.8	66.2
1916.....	19,069,000	35,464,000	55,533,000	35.0	65.0
1917.....	22,439,000	33,168,000	55,607,000	40.4	59.6
1918.....	25,997,000	30,481,000	56,478,000	46.0	54.0
1919a.....	25,000,000	19,650,000	44,650,000	56.0	44.0

(a) Estimated, subject to revision.

NEW BYPRODUCT OVENS COMPLETED AND PUT IN BLAST IN 1919

Company	Location of Plant	No. of Ovens	Type of Ovens	Date Blown in
New plants:				
International Harvester Co.....	South Chicago, Ill.	88	Wilputte	Nov. 13, 1919
Steel & Tube Co. of America.....	Indiana Harbor, Ind.	120	Semet-Solvay	Aug. 28, 1919
Ford Motor Co.....	Detroit, Mich.	120	Semet-Solvay	Oct. 14-Dec. 6
Jones & Laughlin Steel Co.....	Pittsburgh, Pa.	240	Koppers	June 18, 1919
Rainey-Wood Coke Co.....	Swedeland, Pa.	110	Koppers	Aug. 26, 1919
Providence Gas Co.....	Providence, R. I.	40	Koppers	Jan. 28, 1919
Additions to existing plants:				
Tenn. Coal, Iron & R.R. Co.....	Fairfield, Ala.	77	Koppers	Dec. 17, 1919
Citizens Gas Co.....	Indianapolis, Ind.	40	Wilputte	Jan. 31, 1919
Indiana Coke and Gas Co.....	Terra Haute, Ind.	30	Koppers	Jan. 1, 1919
Bethlehem Steel Corp.....	Sparrows Point, Md.	180	Koppers	Jan. 1, 1919
Seaboard By-product Coke Co.....	Kearny, N. J.	55	Koppers	Jan. 21, 1919
Carnegie Steel Co.....	Clairton, Pa.	128	Koppers	June 3-July 1
Total.....		1,228		



To Present Public's Viewpoint

The Coal Commission appointed by President Wilson to investigate the bituminous industry on Feb. 11 fixed Tuesday, Feb. 17, as the day to begin hearings of the public's side in the inquiry, when representatives of public-utility corporations, individual consumers, manufacturers and consumers were to appear, this phase of the inquiry to run on for at least a week.

It is stated that the commission has received a number of protests from representatives of the consumers urging that it take no action that would increase the price of coal in the market. These protests have carried with them strongly-worded requests to be heard, after the respective cases of the miners and operators were in.

Committee on Price Investigation Established by Coal Commission

Chairman Robinson of the Coal Commission announced the personnel of a sub-committee of five which will consider the effect of the recent 14 per cent wage advance upon operators' profits. The sub-committee will consider the protest of the operators, voiced before the commission, that, under the fixed price for coal of \$2.35 a ton, at the mine, together with the wage advance, their profits have disappeared, while many mine operators actually face possible bankruptcy.

Commissioner Robinson, touching upon the fixing of prices, before the Coal Commission has emphasized the point that the commission had no authority to fix any prices, and that it did not expect to ask for such authority from the President, even in the event that it considered a readjustment of prices necessary, until the commission had agreed upon its final award.

In announcing that the commission would look into the matters of coal prices, he said:

"There have been references and statements made by both operators and miners bearing on the subject of past and present profits of operators," said Mr. Robinson. "The commission desires to say that it will treat the question of profits as one of the factors, and that in making its award, including the fixing of prices, if it shall fix prices, it intends to use available evidence on profits both as it relates to wage scale and to prices, if the latter are to be fixed."

COMMISSION WITHOUT POWER TO FIX PRICES

"The commission desires to say further that it has no authority to fix prices, that it does not expect to ask for authority until it has unanimously agreed on its final award, including the fixing of prices, if it concludes that there is a need for price fixing. In making the award the information furnished to the committee will be used, together with other information bearing on the subject."

"It is the belief of the commission that this method will enable the determination of cases brought before it more quickly than as if it now had the authority to fix prices, and should take up cases separately with the idea of adjusting the particular situation."

"It is fair to assume that the President expected that the 14 per cent increase would be applied by the operators and miners in a manner to stabilize the industry, pending the survey and final award of this commission. In making this award the commission will consider and determine the application of the 14 per cent average wage increase."

The sub-committee is as follows: John P. Cameron, chairman, a Pittsburgh mine operator, regional distributor for central Pennsylvania under the Fuel Administration during the war; C. E. Leshner, of Washington, D. C., statistical expert for the Geological Survey; Percy Tetlow, of Salem, Ohio, statistical expert for the United Mine Workers of America and a secretary of the Bituminous-Coal Commission; D. M. Reynolds, of Pasadena, Cal., Western representative of the Council of National Defence, and Paul White, of Cleveland, Ohio, son of John P. White, the latter of whom is the representative of the miners on the Bituminous-Coal Commission.

The sub-committee will sit in Washington, devoting itself entirely to the question of fixed prices, and their effect on operators' profits, in relation to the wage advance. Chairman Robinson, in announcing the personnel of the committee, reiterated his statement of Monday that the commission has no authority to fix coal prices and will not determine whether to ask the President for authority to do so until after it has "unanimously agreed in its final award." Mr. Robinson added: "In making the award the information furnished to the sub-committee will be used, with other information on the subject."

The operators have contended before the commission that no wage advance to the miner is needed and that even the 14 per cent advance was not necessary to enable the miner to meet the advanced cost of living.

As regards coal shortage, Mr. Robinson recently said: "The commission also desires to say that both the operators and miners have referred to a car shortage, and car irregularity, but the reference has been general. The commission desires to give to both operators and miners, opportunity of presenting reasons, so far as the same can be established, for this shortage and irregularity."

The various sections outside the central Competitive region are presenting their individual cases before the commission. In particular the Central Pennsylvania region is anxious for the complete elimination of car pushing, urging that mine cars are increasing in size and that the placing of them at the face or on the parting is work appropriate to mule or locomotive.

Check-Off Restored in New River Field

The check-off has been restored in the New River field. It has been the subject of controversy between the operators and the miners of that region ever since the contract of Sept. 1 was abrogated automatically on Nov. 1 by a strike of the miners of the New River field, in violation of their contract. Decision to restore the check-off was reached at a meeting of members of the New River Operators' Association held in Charleston on Wednesday, Feb. 4. The meeting of the operators' association preceded a joint meeting between representatives of the New River Operators' Association and the representatives of the miners of District 29 of the United Mine Workers of America.

As soon as a decision had been reached at the operators' meeting, representatives of the miners were called in and a joint meeting was held, and the decisions reached will doubtless end the 10-day strike that has prevailed at a number of plants in the New River field. This action on the part of the operators followed a long interchange of communications with the authorities at Washington. The chiefs at the capitol have insisted that the "status quo" of Oct. 31 must be restored despite the fact that the miners

broke their newly signed contract without any occasion on Nov. 1.

It is considered likely, although no definite statement has been made to that effect that the restoration of the check-off was directed from Washington. On the other hand there were several of the larger companies in the New River field who had continued the check-off system and there were still others who were insisting that the check-off be restored, as by doing so, production would be no longer hampered. As a result of the meeting of Feb. 4 the contract of Sept. 1, although broken by the miners when they went on strike, has been restored as of Feb. 1, the deduction for union dues, etc., commencing on that date. The three principal items in the agreement are as follows:

"1. No fines are to be imposed, no initiation fees collected and no penalties of any character imposed, nor is any form of discrimination to be shown against any employee of any operating coal company in the New River field that is a member of the New River Coal Operators' Association, on account of such employee continuing to work, or resuming work at any time after the strike was declared on Nov. 1, 1919. All employees are to be reinstated to their former employment as nearly as possible.

"2. It is understood and agreed that the operating companies, members of the New River Coal Operators' Association, will not collect any dues, assessments, initiation fees or fines, for the period previous to Feb. 1, 1920.

"3. The employees at any of the mines of the members of the New River Coal Operators' Association are to resume work immediately and are to be notified to do so not later than Feb. 5."

While the miners who had been on strike were prepared to return to work on the date fixed in the agreement, they were unable to do so in many cases owing to the fact that no cars were available until the very end of the week or until about Feb. 7, so that the signing of an agreement did not accomplish immediately just what had been hoped for.

Since the first pay day in November no check-off has been in effect in the New River field except at the operations of two large companies. The Charleston agreement of Feb. 4 establishes it everywhere except in the mines of the group of operators in the Glen Jean section, who represent about 10 per cent of the field. They have always resisted the check-off and the closed shop.

Not Safe to Shoot at Workingmen

After a second trial, Tony Stafford, an unnaturalized Italian, a resident of this country for fifteen years and an organizer for District 29, United Mine Workers, was found guilty of an attempt to commit murder in the first degree, by a jury in the Criminal Court of Raleigh County on Jan. 28. Stafford was charged with being the instigator of an attempt to kill a number of mine workers at the plant of the E. E. White Coal Co. at Glen White, W. Va., on Nov. 16, 1917. Stafford was indicted as one of the principals and was tried at the October, 1919, term of court, when the jury was unable to reach a verdict. The situation was very tense at that time, the miners having made numerous threats that the defendants would never be brought to trial.

At the second trial the chain of evidence was more complete and the jury lost no time in reaching a verdict. Briefly it was alleged that Stafford had advocated the use of force to win a strike of miners even though the Government was then at war, and in pursuance of a general plan of violence Stafford organized a party who, stationing themselves on a hillside overlooking the Glen White tippie proceeded to riddle the tippie with bullets endangering the lives of men who had just come up on a cage at 4 p.m.

Stafford was implicated in the trouble on Cabin Creek in 1912-1913 and was sentenced at that time to serve a term in the penitentiary, but was pardoned by Governor Hatfield. Stafford has frequently boasted that the law could not touch him. Others awaiting trial as accomplices of Stafford are Lawrence ("Peggy") Dwyer, international board member of the United Mine Workers for District 29, and Obe Clendenin, an organizer.

Colorado, Wyoming, Montana and Washington Present Striking Evidence

On Feb. 9 the Bituminous Coal Commission took up an inquiry into the bituminous mountain districts of Colorado, Wyoming, Montana and Washington. Striking evidence showing the wage earnings of miners in those districts was offered by Mr. White, representing the operators of Montana. Mr. White put in figures taken from the mine records, showing that contract miners earn from \$7 to \$10 a day, and that day labor is paid \$5.64 to \$6.95 a day. The day wage rate has increased in Montana since 1915 from 70 to 90 per cent.

"During the year 1919 practically every commercial operator in the state," Mr. White said, "has operated at a loss, even though selling prices have advanced from 30 to 55c. a ton for lump coal." He urged that some way be found to make the miners responsible for their contracts with the operators. Strikes in violation of contract, he said, have worked a tremendous hardship to the industry.

Will Try to Unionize Pocahontas

During the visit of President John L. Lewis of the United Mine Workers of America to Bluefield, W. Va., in the Pocahontas region he indicated that a corps of organizers would be sent into the Pocahontas field just as soon as a plan of campaign was completed. He therefore devoted part of his time while in Bluefield in trying to find quarters for such organizers and other members of the United Mine Workers' staff who might be detailed to such work. He also sought to establish financial connections at a Bluefield bank, but arrangements for the opening of an account were not completed during Lewis' stay owing to the fact that the question of accepting a deposit had to be submitted to the directors of the bank.

Sentiment not only among the coal operators of Bluefield and other sections but among business men in general is decidedly against the organization of the Pocahontas or any other region now unorganized, in southern West Virginia, and decided views were expressed by citizens of Bluefield, the Bluefield chamber of commerce adopting a resolution against the proposed organization of the miners. On the other hand, organized crafts and brotherhoods in and around Bluefield are favorable to the proposed unionization of the southern coal fields.

Much doubt is expressed in coal circles as to the ability of the United Mine Workers to bring their campaign for the organization of the Pocahontas and other regions to a successful outcome. Announcement has been made from time to time by district officials of the U. M. W. of A. in West Virginia that they expected to make an attempt to organize the miners of the Pocahontas field. Operators, therefore, were not unprepared for the present move of the United Mine Workers' organization and if the southern fields are unionized it will not be without a struggle, as the operators of the sections which would be affected have made plain since the advent of Lewis and his associates.

Strikes in the Indiana Field

Twenty-one strikes in the bituminous coal fields of the Terre Haute field during the month of January, causing a loss of 28 days of mining time, were reported at the headquarters of the Indiana Bituminous Coal Operators' Association at Terre Haute, Ind. Practically one-fourth of the mines in the field, numbering 85, have been on strike and the loss in production amounted to 28,108 tons.

Want Maintenance Work Divided

Instead of striking for shorter hours and less work, miners employed at what is known as the Webb mine at Shadyside near Wheeling, W. Va., went on strike during the last week of January for more work, asserting that they were entitled to a share of the maintenance work given other day men when the mine was idle.

COAL AGE

PUBLISHED BY MCGRAW-HILL COMPANY, INC.
TENTH AVE. AT 36TH ST., NEW YORK
Address all communications to COAL AGE

Volume 17

February 19, 1920

Number 8

Making Trusts by Enactment

THE PLAN to consolidate the railroads is but a scheme to make them forcibly into trusts. When each region becomes an organic whole there will be no other plan open to the public than to prevent the trusts by Government ownership or control, from oppressing the public, for at all times, if the oppression is not actual, the potentiality of it will be a nightmare (imaginary possibly, but nevertheless a nightmare) to the politician.

A certain tyrant once said: "Oh that the people had but one head that I might lop it off." Congress seems to pray for monocephalous railroad systems that it may use them in the same manner.

A League of Essential Industries

WHAT IS here said is really not about essential industries at all, but about industries that the people regard as so essential that they wish to curb and control them. Some are not so really essential, as sugar for instance, and all are essential only in part, because in many cases they only minister to inessentials.

Then, again, the automotive industries say they are essential, but if you test the persons engaged in them by saying they are so essential that profits and wages must be curbed they declare with vehemence that they are essential but do not have that element of essentiality which makes them fit subjects for price control.

But all those who are attacked, which must eat soured corn to please their masters, the luxury industries, should be one in demanding justice. Not from the coal men should come a call for unfair freight rates, not from railroad men should come a cry for unfair coal prices, not from the street-car and power companies should be heard a shout for mine control, not from the packers should there be complaints against the transportation industry. All the essential industries should be one in a cry for justice and fair dealing. The public needs require that the essentials stand together for their rights. Otherwise they will perish and the public will suffer.

A host of distributors, middlemen and caterers to public foibles, a crowd of people who have money for folly and none for useful things, surround the public utilities with their selfish clamor. Let us rally together round a standard of fair play and honest purposes. The owner of the *Dearborn Independent*, who in a few years has made his tens of millions in making automobiles, is leading the hosts against those who are making scarcely a profit and often a loss.

The multi-millionaires of nondescript industries are clamoring for subservient utilities that will serve as men with the hoe. We want no trust but merely a truce. Let every useful industry, assailed by the children of fashion and ease, leave every other useful

industry alone and unhampered so long as its course is fair and honorable. Let us forget the past or remember it only in proper proportion. Have not the industries that make trade-marked proprietary articles also watered their stock and profiteered? Are they not doing it yet? Why hunt up the past of the essential industries and be stoneblind to the present of the non-essential?

Where Bolshevism Failed

NO ONE knows just exactly what Bolshevism is. Some would define it as the ownership by the worker of the tools of his employment and the receipt by him of the entire outcome of his labor. Neither of these provisions will work in practice, but they have at least, a goodly outward appearance.

Whatever Bolshevism may be in theory, in practice it is confiscation pure and simple. The Bolshevik takes what another man has labored to produce. If the Bolshevik does not destroy it, he uses it for his own convenience. What is the outcome? No one wants to produce, for it will be taken from him when he has produced it, and if he needs anything for which he has not labored there is always the way of loot to get what he covets. Consequently the well-disposed person produces little and hides what little he creates, and the ill-disposed person relies, at least for a while, on getting by force what he believes the better-disposed person will produce. Soon no one is producing, and then, at last, everyone becomes convinced of the necessity of toil and the ill-disposed realize that loot as a law of being has its disadvantages.

It is a long way from Russia to the United States, but still there are people who need to learn that the errors of Bolshevism are prevalent here and ensconced in high places. Railroads in the anthracite region have built and put in service many coal cars that their mines may work steadily. The Railroad Fuel Administration finding cars in demand in Chesapeake & Ohio Ry. territory takes cars from the anthracite fields and puts them to hauling coal in West Virginia. Does that encourage car buying either in the anthracite region or by the Chesapeake & Ohio? The first will not buy what it is not allowed to use, and the second will not purchase cars when they can be taken from some other more foresighted company.

Similarly, when industrial companies were allowed increased car allotments by reason of their ownership of freight cars, they bought them freely and helped to equip the railroads. Afterwards, when they were forbidden that advantage they bought no more, and the supply of cars failed to keep up with the demand. The use of the cars was practically diverted from their owners and granted to others who had no share in the ownership.

In like manner the repeated grant of the right to seize coal in transit to the Railroad Administration did not encourage it to buy and store coal in the summer. It felt that it would not be so well assured of its supply by storing as it would be if it were permitted to commandeer it at pleasure.

Eventually commandeering of product and controlling of industry must cease. It is a "babying" of the weaklings of industry and a disheartening of the strong and self reliant. It gives to the infrugal the product of the frugal; it hands to the careless the savings of the prudent; it makes judgment and energy unprofitable

and madness and laziness no disadvantage. He who risks borrowed money on improvement finds his competitor is given the use of his investment, and he is indeed fortunate if the risk he has taken does not bankrupt him when the appropriate usufruct is denied him.

Our New Slogan "Do Without"

OF ALL the sad reminiscences of the European war one of the most persistent is the slogan "Do Without." No doubt it is the part of patriotism to accept with resignation all the necessary burdens of war shortages, but now peace is declared they seem to be more numerous than ever, and we are beginning to learn that the trouble is in the remedies by which we are continually trying to meet them.

We consistently endeavor to cure symptoms rather than diseases. The cures do well for a while, but the root of the evil is not reached. A palliative is not a cure. In the winter of 1917-1918 we were ordered to do without work during the celebrated workless days in order that coal might be moved on the railroads and the ships in the harbor might be coaled, and we did as we were ordered, even those of us who had stocks of every kind of material, including coal, on hand or were using water power or electricity generated by the energy of water or were using coal that did not pass over the railroad tracks and materials that had already passed with much difficulty through the railroad muddle.

It was said that by doing without work we "mortified our souls" and learned as in no other way what the war meant. In this manner the Administration in the midst of a great war excused itself for an immense waste of human energy in the districts supplied by hydroelectric power, in industrial works that had been forehanded enough to provide themselves with fuel and in establishments so near the mines that shipment by motor truck or horse wagon was practiced or was possible.

It was said that Dr. Garfield knew that he was following the wrong and indirect course, that the railroad embargo was the right cure, but he wilfully adopted the wrong remedy because William D. McAdoo, then United States Railroad Administrator, would not admit

that he was nonplussed and would not consent to declare an embargo. This story may or may not be true, but even if true it does not save Dr. Garfield, for he could easily have given exemptions to all industries not calling on the railroad for fuel, as he did to those plants which were essential to the nation's defense and sustenance and were rightfully given that exemption.

But this was only the beginning of the campaign of "Do Without." It was followed by many others of which everyone approved, but what is difficult of understanding is why the condition continues. Why should the mines have to do without cars, the people to do without coal and the miners to do without work? Simply because we have declared that expenditures must be made without due profit and services rendered without meet compensation. Men might be found willing to lend money without return, but they will not run the risk of losing their money unless some hope of reward is given that will overbalance the risk.

In the cities men are doing without street-car service and are walking the pavements because inadequate returns are being allowed the street-car companies, which are drifting, or have drifted already, into bankruptcy. Our schools are being closed or taught by inefficient teachers because a fair compensation is not paid to the instructors.

Sugar is scarce because the rewards provided were not adequate to make the public build more mills. All things are in short supply and this is so, in part at least, because the railroads fail under inadequate rates to meet the need for transportation facilities. Nothing "does without" except labor, and the luxury industries. The two are getting the savings that should vitalize the railroads and other public utilities.

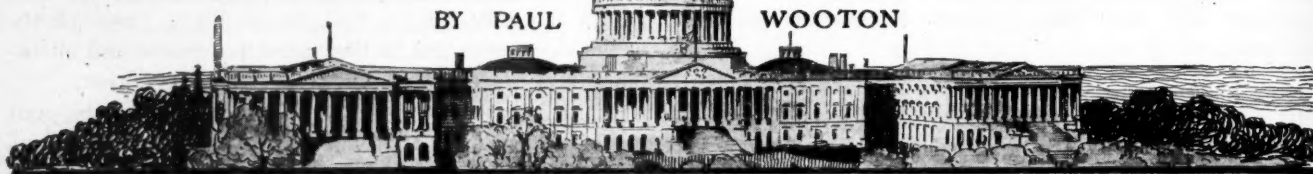
The married couple that fails to raise a family lives easily on its income. Nevertheless childlessness marks the closing days of any nation. So the workman who is allowed to consume all he makes, soon puts an inglorious end to the national growth. No man who uses all he produces for his own advantage holds in his hand any gift to aid the progress of the nation. We must always remember that as we grow in numbers we must provide for larger output and that can only be done by national saving.



NEWS FROM THE CAPITOL

BY PAUL

WOOTON



Mineral Leasing Bill Near Passage

House Expected to Adopt Conference Report on the Measure

THE OIL and Coal-Leasing bill, agreed to in conference and ready for final action of Congress, in the opinion of Representative Frank W. Mondell, Republican House leader, is the "greatest triumph of the cause of proper conservation of public resources up to this time," and represents real constructive legislation. The House is expected to adopt the conference report.

By its terms coal under 50,000,000 acres of land, gas and oil in the remaining public domain of 700,000,000 acres and the phosphate and sodium in the public domain would be reserved in public ownership. The rights to develop these minerals would be given to individuals under leases, and the proceeds of rents and royalties would be divided between the states in which the minerals are found and the Federal Government. The latter's share is to be placed in the reclamation fund for future development along irrigation lines in the Western States.

MANY BILLS HAD BEEN PRESENTED IN CONGRESS
BUT NONE HAD BECOME LAW

"For more than ten years," said Mr. Mondell, "the question of providing legislation which would retain in the hands of the government the title to the remaining public coal, oil and oil shale, gas, phosphate and sodium lands, and the deposits of these minerals that have been reserved in lands to which a limited title has passed, and the adoption of a system of development under leases controlled and supervised by the Federal Government, has been before the Congress, and bills proposing such a policy, to a greater or less degree, have passed both Houses several times, but the bills did not satisfy the friends of real leasing legislation and failed to become law.

"Under the provisions of the bill the minerals referred to, and to a certain extent the lands which contain them, will be leased to citizens of the United States in limited areas at royalties which, in a large measure, are to be determined by public bidding, and under conditions which insure the mining and utilization of the minerals without unnecessary loss and under conditions favorable to the health and safety of those engaged in these enterprises.

PRESENT BILL TO SAFEGUARD THE PUBLIC

"The bill is a decided improvement over the legislation that has preceded it, because it is strictly a leasing measure and its provisions safeguarding the public interests are more carefully guarded than heretofore. Its provisions affecting the rights of those now claiming under the present land laws containing these minerals are believed to be just and equitable."

Payne Chosen for Secretary of the Interior

Shipping Board Chairman Selection as Lane's Successor; Ex-Senator Shafroth Slated for the Place

John Barton Payne, chairman of the Shipping Board and formerly general counsel of the Railroad Administration, will become Secretary of the Interior March 1, succeeding Franklin K. Lane, whose resignation becomes effective on that date. While White House officials declined confirmation, it was understood that former Senator John Franklin Shafroth, of Colorado, has been offered the place vacated by Mr. Payne.

Chairman Payne said tonight that he would accept the appointment to the Cabinet because it was the wish of the President, but "my heart is in the Shipping Board."

Mr. Payne said he would ask the President that he be permitted to stay on at the Board for a few weeks to enable him to leave a comparatively clean slate for his successor by disposing of the immediate business before the Board, including the sale of the former German passenger ships and the reorganization policy now being effected.

Bureau of Mines Asks for \$20,000 Appropriation

In addition to the \$576,877 which already has been appropriated for investigating mine accidents and operating mine-rescue cars, Dr. Van H. Manning, the director of the Bureau of Mines, has asked for a deficiency appropriation of \$20,000. This is intended largely for the printing of miners' circulars. The need of these circulars, as explained by Dr. Manning, has been laid before the Committee on Appropriations.

Coke Producers Protest Fixed Prices

Coke producers are pointing out to officials here the injustice of having the limits maintained on coke prices while iron rises to \$40 a ton. This, it is claimed, gives the steel interests an additional profit at the expense of coke manufacturers. A modification of the order is asked so as to permit contract prices to be in effect as in the case of coal where it exceeds the Government price.

Railroads Refuse to Change Contract Price

Refusal of the Railroad Administration to readjust contract prices when the price exceeds the government level has resulted in a vigorous protest by the National Coal Association. A large number of operators are affected.



DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Ballasting Mine Tracks

Letter No. 2—I read with much interest the excellent letter of Jerome C. White, *Coal Age*, Nov. 6, p. 756, giving his experience in the use of broken stone for ballasting mine tracks. Kindly permit me to add a few lines describing my own practice in mine trackwork.

First, a good mine track is very necessary to obtain the best results in either mule or motor haulage. A straight road, with easy curves and light grades is also an essential factor wherever conditions will permit. In any case, however, it is of the utmost importance to have and maintain a good solid roadbed that is well drained and ballasted with material that will hold the track in line and prevent low joints.

One of the chief requirements in mine haulage is that the rails shall be supported on solid wood ties of a size that will hold the track in place and prevent derailment of the cars through the spreading of the rails. The best wood for track ties, in mines, is oak, tamarack, or hemlock. Track ties should be slabbed on two sides, so as to give a flat bedding for the ties and rails. The bark is preferably left on the remaining two sides. It is my belief that this method will give the best results.

The size of mine-track will depend on such conditions as the kind of haulage employed, weight and size of mine cars and locomotives in use, character of roadbed and floor of the seam, conditions regarding drainage and care and maintenance of the tracks, all of which must be considered in the selection of good ties.

In a small mine employing mules and where the haulage is light, the ties should have a thickness not less than 3 in. and a width of 4 or 5 in. Under a heavier service employing mechanical haulage, either rope or locomotive haulage, the track ties should be at least 5 or 6 in. thick and from 6 to 8 in. wide. The size should be uniform throughout, as ties of different dimensions should not be placed on the same roadway. Mine-track ties should be spaced, say 16 ties to a 30-ft. rail, or 18 ties to a 33-ft. rail, under fairly normal conditions of roadbed and bottom.

Much interesting information is given on the selection of material and the laying of mine tracks, in a little book entitled "Mine Tracks, Their Location and Construction," by McCrystle. Speaking of ballasting the tracks, Mr. McCrystle gives the preference to the

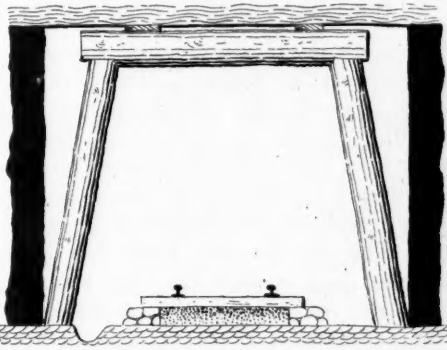
use of the following: 1. Broken stone, which he regards as excellent. 2. Cinders and ashes from the power house, good. 3. Breaker slate, only fair. 4. Coal slack and other refuse, poor.

The same author states that all rock used for ballast should be broken to a size that will pass through a 3-in. ring. He also says that there should be at least 3 in. of ballast on all roads, and this should be thoroughly tamped, particularly under those portions of the tie directly beneath the rails.

The practice described in Mr. McCrystle's little book agrees with that recommended by Mr. White to whom I referred previously. It also conforms to my own experience, in respect to the use of crushed stone for ballast. In connection with this subject, I have introduced a little sketch intended to illustrate what I have found equally good as ballast and often cheaper than broken rock. As shown in the figure, stone, or a good quality of slate, is built on each side of the track and the middle portion of the bed filled in with coarse gravel. I have found that this makes a very good roadbed whenever such material is available for use.

Rawdon, Quebec, Canada.

C. McMANIMAN.



PROPOSED METHOD OF BALLASTING TRACK

Labor and Democracy

Letter No. 4—The readers of *Coal Age* are to be congratulated on the opportunity presented for the discussion of the present relation of labor to democracy. I was greatly pleased to read the letter of "Loyal Worker," which appeared in the issue, Dec. 25, p. 938. The writer of that letter could not have stated more plainly and concisely my own convictions as derived from personal experience.

In commenting on what the "closed shop" means to an honest workman, this writer makes the following statement, which is well worth repeating: "In the closed-shop plan, the worker is not his own master. He is not free to express himself if his thoughts are opposed to the ethics of the leaders. The very atmosphere of the shop breathes fear and distrust in the worker." Many who have passed through these experiences can vouch for the truth of this statement. The worker in a closed shop most assuredly has a rope about his neck and, as our friend has expressed it, must "watch his step" if he would avoid difficulty.

INJUSTICE DONE AN HONEST MEMBER OF MINERS' LOCAL

The same writer speaks of the man committing a "breech" that gives the watchful committee their longed-for opportunity to recommend his discharge. I could give an instance where it is not necessary for the worker to commit a breech to bring him into disfavor with the committee, and others can probably do the same, as such instances are of common occurrence. For nearly two years, to my knowledge, a certain honest worker has fought for his rights and for justice.

Some time ago, this man was charged with committing an act that merited a penalty as a member of the local to which he belonged. His act was right in accordance with the Washington agreement, made in 1918, and the penalty was wrong under the Lever Act of Congress. When the penalty was imposed on this worker, he requested of his local to be informed where he had violated the district contract or local bylaws.

The member making the complaint assured the man that there was an entry on the minute book of the local that he had violated. For two years, however, this honest worker has been on record as having requested to be shown the minute of the local that it was claimed he had violated and for which he was penalized to the amount of \$5 and other expenses, without receiving any satisfaction in answer to his request.

FAIRNESS AND JUSTICE A CHIEF REQUIREMENT

In the same letter, "Loyal Worker" states: "Conservative forces will always accept a solution that is tempered with fairness and justice." In the instance to which I have referred, the penalized member deserved justice at the hands of the District Executive Board to which he applied. His claims, however, were met with perjured rebuttal and forged signatures, which perverted the ends of justice and caused the Executive Board to misjudge this suffering member.

The readers of *Coal Age* can judge for themselves as to the course to be pursued in securing justice. Appeal to the War Labor Policy Board, in this case, brought the suggestion that it was a matter to be placed before the Fuel Administration. In the opinion of the assistant attorney-general, it was not the class of business that concerned the Department of Justice. The only satisfaction the suffering member received was that the Fuel Administration thought he must have violated some law of the U. M. W. of A.

To make a long story short, repeated requests made of his local and appeals to the district president to be informed as to what part of the contract he had violated, or what bylaw of the local he had broken, have met with no response. In view of these facts and numerous others of like import, my opinion is that labor is fast becoming an autocratic government over its members. My advice is that all honest workers should fall back and line themselves with democracy if they desire a healthy development of labor conditions in the future. It goes without saying that no one, of his own free will, would desire to be under autocratic rule or a member of an organization where justice is preached but not practiced.

W. H. LUXTON.

Linton, Ind.

Health and Industry

Letter No. 1—Some time ago I recall reading an excellent Foreword in *Coal Age* [Vol. 15, p. 519], entitled "Health and Industry." At no time have the suggestions made in that Foreword been more timely than at the present, and I wish to emphasize a few of the points mentioned and urge their application in combatting the present condition that prevails to so large an extent in the coal industry, today.

The author of the Foreword, Floyd W. Parsons, makes the following statement: "The degree of health that employees enjoy determines largely their degree of

happiness, contentment and efficiency." Few who have been close observers of industrial conditions in coal mining will deny that those workers who enjoy physical health perform more efficient and valuable services to the companies who employ them, than those who suffer from ill health or are physically weak. The healthy man looks on life from a different viewpoint. He is contented and happy, while the less able-bodied man is discontented and often unhappy. The results of these two conditions in the health of the worker are plainly evident to their employers.

SANITARY CONDITIONS PROMOTE HEALTH

Coal operators who neglect or refuse to consider the physical health and the sanitary and social environment of their employees make a vital mistake. There is no question but that wholesome and pleasant environment promotes health and happiness, which mean contented and efficient workers. This being true, it is of prime importance that mine officials make every possible provision for the health, comfort and enjoyment of their miners. By this means they may be won over more successfully to higher and better methods of living and become more efficient workers and better citizens.

The question of contentment among workers is an important factor in the operation of coal mines. There are diseases of the mind as well as ailments of the body, and the former are often more baneful and more to be dreaded than the latter. The diseased mind is fertile soil for sowing the seeds of radical socialism, unrest and discontent, which if unchecked will develop into Bolshevism. The disease is contagious and spreads rapidly, bringing strikes and labor disturbances. The most effective cure for a diseased mind is more desirable living conditions and a healthier social environment.

MORAL AND SOCIAL ATMOSPHERE IMPORTANT

In addition to the consideration of the health and contentment of workers, there is another important factor, namely, the moral and social atmosphere surrounding them. It will not be denied that moral and sober men make a better class of miners.

Compare the miner who cleans up for Sunday, attends church and Sunday School with his family, with the man who shuffles out from his home every Sunday morning and spends the day loafing about town. Is there any question but that the former type of individual makes a more reliable, constant and efficient worker than the latter? The one learns to respect himself, which develops a high regard for others, while the negligent and careless habits of the other engenders a lack of selfrespect and a disregard for others.

In my judgment, all efforts to educate and train mine workers and improve their living conditions along the lines suggested cannot fail to prove a paying proposition. To the extent that a man sets a higher value on himself and his fellows, to that extent he becomes more valuable as a workman.

PRACTICAL RELIGION THE NEED OF THE HOUR

The report of Roger W. Babson, who made a careful study of the social, economic and political problems confronting the American people today, contains this statement: "The need of the hour is more religion." He states, "The solving of the labor situation is wholly a question of religion." He would have the reformation

start with Congress and follow down the line to factories and mines. I believe his conclusions are right and that the differences between capital and labor depend on the honest application of the Golden Rule.

In my opinion, there is enough religion in the world, but it is of a kind that goes no farther toward changing and reforming the life than subscribing to some creed and having one's name enrolled on the church record. Such religion is mere hypocrisy and will never settle labor troubles by the Golden Rule.

A SOUND MIND IN A SOUND BODY

Referring once more to the Foreword, we read in the closing paragraph the following: "Above all things, at the present moment, we need sound minds, and these we cannot have unless first we have sound bodies." Nothing can come nearer to the truth than that a sound and vigorous mind, free from selfishness and actuated by a Christian spirit, will rightfully adjust all differences between capital and labor.

Let employer and employed each remember that an honest day's work calls for an honest wage. The worker who possesses a Christian spirit and whose life is measured by the Golden Rule will give an honest day's work, and the employer of like spirit will reward him in the same measure. Strikes and lockouts will then be a thing of the past and labor troubles will be ended.

JOHN ROSE,

Dayton, Tenn. Former District Mine Inspector.

Maximum Coal Extraction

Letter No. 1—To those who have studied the problem of obtaining a maximum extraction of the coal from a given seam, in the light of practical experience, it is often surprising that the methods employed in certain districts yield the percentage claimed.

The discussion just closed relating to the extraction of 50 per cent of the coal in one of the important coal fields of this country is an illustration of the need of studying carefully the conditions before deciding on what method to employ for working out the coal.

The study of the conditions affecting extraction, in a mine where the recovery is low, will generally show that in order to reduce the loss of coal in that mine a radical change in the method of working is very necessary. In many instances it will appear surprising that the loss has not been greater.

MINE SQUEEZE THE DESTRUCTIVE FACTOR

The big factor to be considered in most cases is the squeeze and the elements producing it, and, having done this to apply some system of mining that will offset these destructive elements.

Squeeze or creep is generally due to a weak floor, small room pillars and often to some extent, to the structure of the coal which may rash easily at some point in the seam. The height of the seam too aggravates a squeeze after it has once developed. Comparatively speaking the roof strata may be good, and yet other conditions that exist may be such as to invite squeeze in the working of the mine.

It frequently happens, that too much ground is opened up at once. The panels are laid out too large, and too much time is consumed in development, before room pillars are extracted. In such cases, a whole year may be required to drive a panel entry and the same length

of time consumed in driving the rooms which means that the pillars adjacent to the panel entry have to stand for two years approximately before they are extracted. Should it happen that the room pillars are too small, it would not be surprising if a squeeze developed before the rooms are completed and the pillars drawn back to the entry.

In mines where the conditions are quite favorable it is not considered good mining practise to leave room pillars in place for a great length of time. Speed in extraction is one of the essentials to a good recovery, and pillars must be extracted, as soon as possible after the rooms are driven up, and the roof strata allowed to cave behind so as to reduce the overhead pressure.

TOO RAPID DEVELOPMENT INVITES FAILURE

When the attempt is made to work up a large output as quickly as possible the really important features, which enter into the ultimate success of the mine, have been lost to sight. As stated previously, before deciding on the method of mining to be adopted in any mine, it is essential that the nature of the overlying strata, the underlying strata, depth of cover, character of the coal and the area to be extracted should be fully considered.

The latter information is highly essential and can be had by sinking a series of boreholes, at various points on the property, before any development work is attempted. It may appear to some that this would mean a high initial cost, which will be true in some cases; but if the area to be mined out is large the information gained from the drillhole records is invaluable and will in the long run save money.

It is a mistake, under most conditions, to open too many rooms at once, as such a method brings on an excessive overhead pressure which can not be relieved until the room pillars are extracted and the roof strata allowed to cave. If the floor strata is weak that fact, combined with small room pillars left in, will add considerably to the causes producing squeeze and incidentally lower the recovery.

THE WORKING OF PILLAR COAL

Under ordinary conditions, pillar coal should be mined as economically as the room coal or narrow work. If the pillars are made large and not left in place too long it should be possible to mine part of the pillar by machine and take out the pillar butts left in against the gob, by hand. The roof strata should be made to cave as early as possible after a few of the pillars have been extracted. If it does not do so some means should be adopted to start a cave, so as to preserve the pillars adjacent to the gob, which will not be possible if a large standing arear is maintained in the gob.

In the latter case when the roof breaks over a large area it is more than likely that it will ride over several of the pillars adjacent to the pillar-extraction line, which may start a slight squeeze on the advancing rooms, causing delay and considerable expense. Except under extraordinary conditions of the roof strata, no serious trouble should be experienced in getting the roof to cave almost when and where desired.

I also favor reducing as far as practicable the width of the rooms, in order to develop more quickly. Any increase in per-ton cost that might result from doing so will be more than offset by the increased recovery and ultimate saving effected by mining on the retreating

method. By adopting this method it will not be necessary to wait until all the rooms are completed, before commencing to extract the pillars. The pillars in this case can be extracted immediately when each room is finished. It can also be arranged to have the rooms completed slightly in advance of the pillar-extraction line. In each case, the room and the pillar-extraction line should cross the roof-strata cleavage planes, say at an angle of 45 degrees.

DESCRIPTION OF A PANEL SYSTEM IN WHICH THE COAL IS TAKEN OUT IN SUBPANELS

By following this method, the pillar extraction line can be more uniformly maintained and the roof strata will be less liable to break in the advancing rooms. In mining a thick seam it is well to leave the top coal up

driven to the boundary or barrier before any rooms are turned off. As soon as the first few rooms are completed in No. 1 subpanel the pillars in those rooms are immediately extracted.

It will also be observed that the rooms reach the boundary slightly in advance of the retreating pillar-extraction line, and in this way the pillars are not allowed to stand for any length of time before being extracted. The extraction line of No. 1 subpanel is kept in advance of No. 2 subpanel extraction line; and No. 2, in turn, in advance of No. 3 extraction line.

Barriers are left in against No. 2 and 3 subpanels, which are later mined out in line with the room pillars, in each case. Barrier pillars are also left in against the north and south and the east and west panel entries, which can be mined out as the management sees fit and

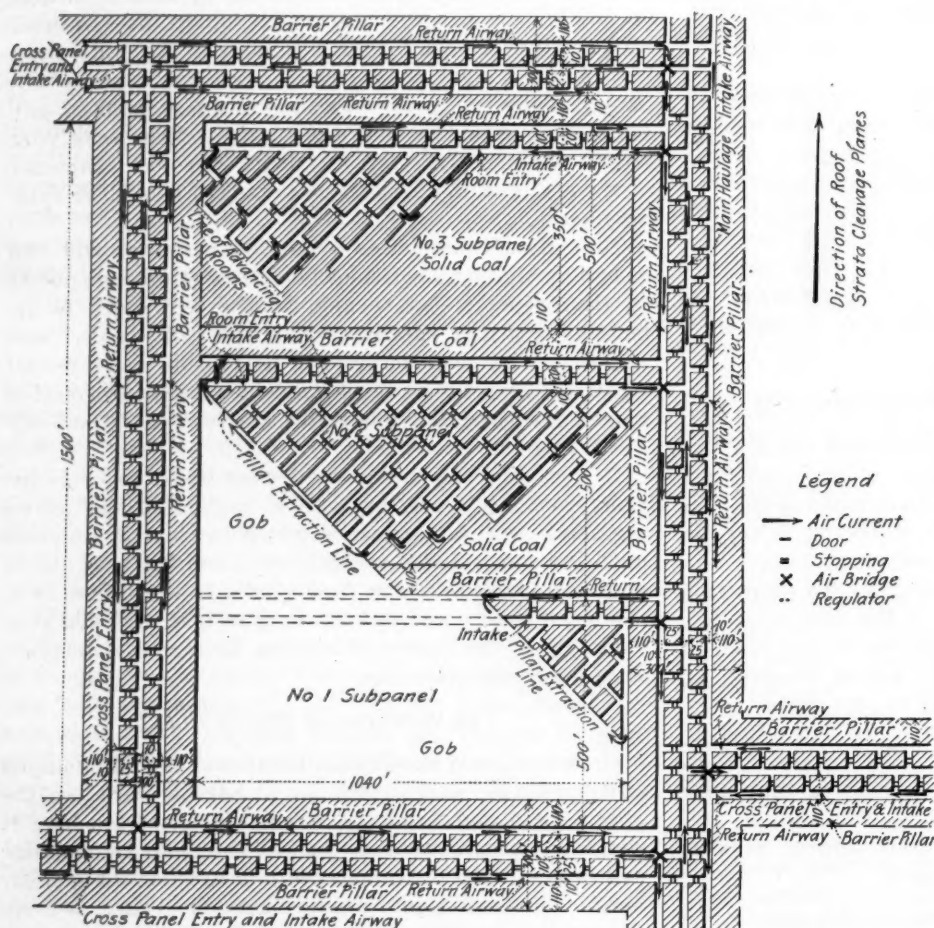
proper. The size of the panels and subpanels, the width of rooms, and the dimensions of room pillars, also the general ventilating system, are clearly outlined in the plan shown in the figure.

In closing let me say one matter that deserves consideration is the cutting of the coal. In mining domestic coal, it is desirable to have as large a percentage of lump as possible. In that case the cutting should be done in the bottom coal, but if that is quite hard I would suggest mining in the softer coal, which in any case will go into the fines. The type of machine in use may be an undercutter, however, and in order to cut in any other part of the seam than the bottom it may be necessary to install a new machine. In that case the matter would require to be fully considered before any change is made.

When working a mine generating much explosive gas and subject to squeeze the use of open lights and safety lamps, to my mind, is not consistent with the safety-first idea and should be discontinued and only locked safety lamps used throughout the

mine. The illuminating power of the more recent types of safety lamps is such that the efficiency of working need not be lowered through such lamps being adopted exclusively. In any case, the practice of using closed and open lights in a gaseous mine is dangerous and is certainly not in line with modern coal-mining practice. In conclusion let me say, it is the duty of all mining men to conserve the natural resources of the country. I am of the opinion that the time is not far distant when the state will take this matter in hand.

J. H. McMILLAN,
Jasper Park Collieries, Ltd.
Pocahontas, Alta., Canada.



METHOD OF EXTRACTION BY SUBPANELS WITHIN A LARGER PANEL

(SCALE, 400 FEET PER INCH.)

in the advancing rooms. No trouble should be experienced in recovering this coal later when the pillars are being extracted. There may be other matters relative to recovery, which I have not stated and which would have to be studied on the ground before deciding on the method of mining to be adopted.

Allow me, here to present the plan shown in the accompanying figure, which I have used and found to work successfully, in mining 6- to 8-ft. coal overlaid with a hard shale roof, at a depth of 500-ft. below the surface. It will be observed that, instead of having one large panel, there are three subpanels, which are worked out as separate units. The cross- or room entries are



INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Semianthracite vs. Semibituminous Coal

Several times, recently, I have been asked to explain the difference between semianthracite and semibituminous coal. This question answered in *Coal Age* would interest many.

Scranton, Pa.

SAGE COE.

The change that takes place in the formation of coal from vegetable deposits is slow and continuous, from the peat bogs to the anthracite beds and the still harder graphite. Semianthracite and semibituminous are grades of coal between anthracite and bituminous, the former containing from 7½ to 12½ per cent volatile matter, and the latter from 12½ to 25 per cent. Any greater percentage of volatile matter classifies the coal as bituminous, although this is merely an arbitrary distinction, there being no exact line of division.

Dead-End in Trolley Haulage

I have been studying a course in coal mining and cannot find where it tells how close the trolley line should be carried to the face of a heading when the heading is being driven and the coal hauled out by a trolley locomotive. I was asked this question the other day by an electrician and also by a wireman.

As I understand it, at the end of a trolley line, an anchor bolt is driven to hold the trolley wire. The question is, how near to the face of a live heading should this anchor bolt be placed? Some say it should be about 30 ft. from the face, while others state that the dead-end of a trolley line should not approach the face closer than 50 ft. As I am a reader of *Coal Age* and appreciate the help given inquirers, I would like to ask for information on this question.

Rawl, W. Va.

ASSISTANT FOREMAN.

It must be rather exceptional practice to carry a trolley line beyond the last parting or sidetrack where the trips are made up to be hauled out of the mine. It is customary, in mine haulage using the trolley system, when the gathering haul is made by mules, to carry the power line to the inby end of the last parting on the haulage road. Where a trolley gathering locomotive is used, the trolley wire can be extended a distance further, so as to permit the locomotive to proceed to the head of the rooms turned off the entry.

As a rule, however, the rooms for a good distance back from the face of the heading will not have been driven to such a depth but that the locomotive can reach the face, by the use of its own cable unwound from the reel. In any case, replying directly to the question asked, we would say that the dead-end of the trolley line should not approach closer to the face of

the heading than the length of the cable on the locomotive.

It is a great advantage, in electric mine haulage, to employ a storage-battery locomotive for use on the gathering haul. A storage-battery locomotive can proceed to any point on the entry and enter the rooms, under its own power, thereby avoiding the use of a reel and cable and the added annoyance of frequently extending the trolley wire. Let us hear from others.

Location of Regulators in a Mine

Allow me to ask the following questions: A shaft mine lying at a depth of 550 ft. below the surface is ventilated by an air current of 200,000 cu.ft. per min. The mine is very extensive and generates an abundance of gas in the gobs. The air current is divided into four separate splits, and the number of men working in each split is practically the same. It is necessary, however, to use regulators to divide the air between the splits.

The questions I want to ask are: 1. Is there any choice in placing the regulators in the different splits in a mine? 2. What advantage or disadvantage, if any, results from placing the regulator; (a) at or near the intake or mouth of a split; (b) at a point somewhere midway between the mouth and the inby end of the split; (c) at the last open crosscut in a split?

Perryopolis, Pa.

R. W. LIGHTBURN.

Theoretically, it makes no appreciable difference whether the regulator is placed at the beginning, midway, or at the inby end of a split. The pressure on the return side of a regulator is always the natural pressure concerned in moving the air, while the pressure on the intake side is greater than this by the amount required to pass the air through the regulator. As a consequence, the density of the moving air is slightly greater before it reaches the regulator than after passing through the opening.

Although this increased density of the air may act to increase the frictional resistance of the current, the effect is very slight and wholly inappreciable. On this score, therefore, the location of a regulator in an air split is quite immaterial.

Viewed from the practical side, however, the case has a different aspect, as a regulator should always be placed where it will least obstruct the operation of the mine. It has been the general custom to place the regulator on the back entry of a pair, outby from the last crossover through which coal is being hauled.

The objection to placing a regulator in the last open crosscut in a split would be that it would have to be moved, from time to time, as the entries are advanced. A location must always be chosen that will be the most permanent and prove of the least hindrance to the daily operations of the mine.



EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD



Miscellaneous Questions

(Answered by Request)

Ques.—What must be the sectional area of a square airway that is required to pass 50,000 cu.ft. of air per minute under a 1-in. water gage, the length of the airway including the return being 5200 ft. Use Fairley's coefficient of friction, $k = 0.00000001$, in the solution of this problem.

Ans.—First, write the formula for the water gage in terms of the quantity of air passing and the dimensions of the airway; thus,

$$w.g. = \frac{p}{5.2} = \frac{k l o q^2}{5.2 a^3}$$

Calling one side of the square airway d , its area is $a = d^2$; and its perimeter, $o = 4d$. Then, for a square airway, the expression,

$$\frac{o}{a^3} = \frac{4d}{(d^2)^3} = \frac{4}{d^5}$$

Now, substituting for the expression o/a^3 , its value just found, $4/d^5$, we have, for the formula for finding the water gage, in a square airway,

$$w.g. = \frac{4 k l q^2}{5.2 d^5}$$

Solving this equation with respect to d , we have, for the length of one side of the required square airway,

$$d = \sqrt[5]{\frac{4 k l q^2}{5.2 w.g.}}$$

Now, substituting the given values in the last formula, we find the length of one side of the required airway; thus,

$$d = \sqrt[5]{\frac{4 \times 0.00000001 \times 5200 \times 50,000^2}{5.2 \times 1}} = \sqrt[5]{100,000} = 10 \text{ ft.}$$

The sectional area of the required airway is, therefore, $a = d^2 = 10 \times 10 = 100 \text{ sq. ft.}$

Ques.—Calculate the centrifugal force developed by a mine ventilating fan making 100 r.p.m., assuming a cubic foot of air in the fan weighs 0.0766 lb., the outer and inner diameters of the fan being 16 ft. and 9 ft., respectively, and the width of the fan blades 4 ft.

Ans.—The area of a circle corresponding to the outer diameter of the fan is $0.7854 \times 16^2 = 201 \text{ sq. ft.}$ The area of the central opening of the fan is $0.7854 \times 9^2 = 63.6 \text{ sq. ft.}$ Subtracting the area of this opening from that of the full circle of the fan gives $201 - 63.6 = 137.4 \text{ sq. ft.}$, which is the area of the annular space covered by the sweep of the blades. Multiplying this area by the width of the fan blades gives for the volume of the fan, $4 \times 137.4 = 549.6$, say 550 cu.ft. The weight of the revolved air within the fan is, then, $550 \times 0.0766 = 42 \text{ lb.}$

In order to calculate the centrifugal force developed by the revolution of this air in the fan, it is necessary to first find the radius to the center of gravity of the air contained in a single compartment of the fan and its velocity, in feet per second. Calling the outer and inner diameters of the fan D and d , respectively, and the radius to the center of gravity, R_g , we have for the length of this radius, in feet,

$$R_g = \frac{1}{2} \left(\frac{D^3 - d^3}{D^2 - d^2} \right) = \frac{1}{2} \left(\frac{16^3 - 9^3}{16^2 - 9^2} \right) = 6.4 \text{ ft.}$$

The velocity of this center of gravity, at a speed of 100 r.p.m., is then $v_g = 100 (2 \times 3.1416 \times 6.4) \div 60 = \text{say } 67 \text{ ft. per sec.}$

Now, calling the total weight of air revolved within the fan W , the force of gravity g (32.16 ft. per sec.), the required centrifugal force developed at the given speed, F , we have,

$$F = \frac{W v_g^2}{g R_g} = \frac{42 \times 67^2}{32.16 \times 6.4} = 916 \text{ lb.}$$

Ques.—Assuming the efficiency of the fan, in the previous question, to be 60 per cent, find the quantity of air it will deliver, at the given speed (100 r.p.m.), when operating under conditions where the mine resistance is such as to give a 2-in. water gage, in the fan drift, where the sectional area is 80 sq. ft.

Ans.—For an efficiency of 60 per cent, the force applied to move the air in the fan drift is $0.60 \times 916 = 549.6$, say 550 lb. The mine resistance is $80 (2 \times 5.2) = 832 \text{ lb.}$ Since the ratio of the acceleration (f) due to a force, to that due to gravity, is equal to the ratio of the accelerating force (KF), to the resistance (pa), we have for the acceleration of the ventilating current, in this case,

$$f = \frac{K F}{p a} g = \frac{550}{832} \times 32.16 = 21.26 \text{ ft. per sec.}$$

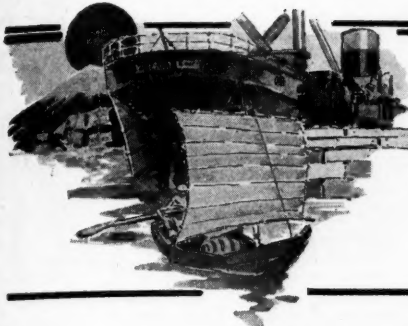
The quantity of air the fan will deliver is then found by multiplying the total force (KF), applied to move the air, by one half the acceleration ($f/2$), and dividing that product by the unit pressure (p), which gives for the quantity of air delivered per minute, by the fan, under the assumed conditions,

$$Q = 60 \left(\frac{K F}{p} \times \frac{f}{2} \right) = 60 \left(\frac{550}{10.4} \times \frac{21.26}{2} \right) = 33,730 \text{ cu. ft. per min.}$$

Ques.—Find the horsepower required to drive the fan, mentioned in the two preceding questions, at the given speed (100 r.p.m.), and under the assumed conditions.

Ans.—The power required to drive the fan is the power applied to the crankshaft. For an assumed efficiency of 60 per cent, this power is

$$H = \frac{Q p}{K} \times \frac{1}{33,000} = \frac{33,730 \times 10.4}{0.60 \times 33,000} = 17\frac{1}{2} \text{ hp.}$$



FOREIGN MARKETS AND EXPORT NEWS



Irish Coal Fields Assuming Greater Importance

Within the last few years Ireland's coal resources have assumed an unexpected importance. A few years ago British coal could be delivered at Irish east coast ports at a cost of from 10s. to 15s. a ton, and coal for domestic use was correspondingly cheap. At the same time, owing to lack of transport facilities, the transport charges alone on coal from the Irish collieries delivered at coastal towns exceeded the cost of imported coal.

As the majority of Irish industrial works are located along the coast, it was evident that there was only a very limited field for the use of Irish coal. However, when sea freights had now increased some five-fold, and imported coal at the Irish ports had advanced to three times its pre-war price, the question of developing Irish coal resources to the fullest extent becomes a very important and pertinent one.

There has not been any geological or mining survey of Ireland which would suffice to determine her coal reserve within a reasonable degree of accuracy.

There is, however, a substantial reserve of coal in Ireland, which, under existing conditions will well repay exploitation. There are coal measures under about 1,800,000 acres—beds of coal have been found in Antrim, Donegal, Tyrone, Fermanagh, Monaghan, Cavan, Leitrim, Roscommon, Westmeath, Kilkenny, Carlow, Clare, Dublin, Queen's County, Limerick, Cork, Kerry and Tipperary.

Coal fields and collieries worthy of consideration are the Castlecomer Collieries, Kilkenny, Wolfhill Collieries, Queen's County; Coalisland Collieries, Tyrone; Arigna coal field, Roscommon and Leitrim, and at Slieveardagh in County Tipperary. The lignitebeds at Murlough, Bay and Ballycastle, County Antrim and in the Lough Neagh district, and at Rossmore, Carlow, might also be profitably worked, though they are of lesser importance. The coal fields which have been proved, or closely estimated are; Leitrim, 152,000,000 tons; Tyrone, 97,000,000 tons; Antrim, 14,000,000 tons; Tipperary, 20,000,000 tons; and Connaught, 9,000,000 tons. These figures are probably all under-estimates especially in the case of Connaught.

The estimated coal reserves in the Castlecomer fields is 60,000,000 tons; in Wolfhill, 60,000,000 tons; in Coalisland, 10,000,000 tons; in Arigna, 20,000,000 tons; and in Slieveardagh, 10,000,000 tons. Though the figures seem modest they mean that the coal practically in sight would suffice Ireland at her present rate of consumption for 35 years, even if no coal were imported, and no other power resources developed.

Ireland imports from Great Britain some four and a-half million tons of coal a year, the purposes for which it is used being approximately: Domestic consumption, 2,155,000 tons; industrial works, 1,400,000 tons; and electrical works, 125,000 tons. There is also in addition a considerable quantity of peat used, almost exclusively for household purposes. The coal consumption of Great Britain is about 185,000,000 tons per year, or 4.4 tons per head of the population; or 2,068 tons per square mile of area. Ireland consumes one ton per head of the population, and 142 tons per square mile of area.

New Rates on Coal to South American Ports

Further changes in the shipping rates on coal and coke from Atlantic and Gulf ports to South Emergency Fleet Corporation were issued last week by the U. S. Shipping Board. Effective Jan. 9, to destinations on the east Coast of South America, rates

are \$16 to \$19.50 per ton of 2,240 lb., while the rates to West Coast ports vary from \$12 to \$22.50 per ton. The new rates on coke to West Coast ports are \$18 per ton.

The new coal tariff, No. 23-A, replaces coal tariff No. 23, which has been cancelled.

RATES OF FREIGHT ON COAL AND COKE FROM UNITED STATES ATLANTIC AND GULF PORTS TO SOUTH AMERICA

COAL		Guaranteed daily discharge of 2240 lbs. (In tons)
East Coast —		
Bahia, Brazil.....	\$16.00	500
Bahia Blanca, Argentina.....	17.50	1000
Buenos Aires, Argentina.....	16.00	1000
Buenos Aires, Argentina.....	17.00	750
La Plata, Argentina.....	16.00	1000
La Plata, Argentina.....	17.00	750
Montevideo, Uruguay.....	16.00	1000
Montevideo, Uruguay.....	17.00	750
Pernambuco, Brazil.....	16.00	500
Rio de Janeiro, Brazil.....	17.00	1000
Rio Grande do Sul, Brazil.....	19.50	500
Rosario, Argentine.....	16.00	750
Santos, Brazil.....	17.00	1000
Santos, Brazil.....	18.50	600
West Coast —		
Guayaquil, Ecuador, to Talcahuana, Chile, inclusive.....	\$12.00	750
Punta Arenas, Chile.....	32.50	500
COKE		
West Coast —		
Guayaquil, Ecuador, to Talcahuana, Chile, inclusive.....	\$18.00	525

Conditions—Coal: Loading 1,500 tons daily; discharge as above indicated, with time counting 24 hours after arrival of vessel, whether in berth or not, Sundays and holidays only excepted. If loading and discharge is not completed within the time specified, demurrage to be paid at the rate of \$1 per net registered ton per running day, payable day by day. Coke: Loading 800 tons daily; discharge as above indicated, with time counted and demurrage payable under same conditions as apply on coal.

South African Coal for France

Extreme scarcity of fuel in all parts of France is causing much disorganization of business, many factories and works of all kinds being brought to a standstill for lack of steam power. The latest expedient, however, is the purchase of 5,000 tons

of South African coal for delivery at Marseilles from the port of Durban, Natal, on which the freight alone is £7 10s. per ton.

The Natal collieries have for some time been supplying the coaling depots in Eastern waters, Perim, Colombo, &c., but this is the first recorded instance of a cargo shipment to Europe.

Japanese Coal Trade Increases

Production of coal during the six years 1915-18 in Japan aggregated 141,392,580 metric tons. The output in the first year totalled 21,315,962 tons, but while there was an increase to 22,293,419 tons in 1914, the following year witnessed a fall to 20,490,747 tons, the smallest out-turn of the series.

In 1916, however, there was a recovery to 22,901,580 tons, which was followed by an expansion to 26,361,420 tons in the ensuing year, and a further increase to 28,029,452 tons in 1918. The exports during the period under review amounted to 18,427,108 metric tons. The first year, 1913, showed the largest figures, at 3,870,600 tons, and, with the exception of a slight recovery to 3,016,947 tons in 1916, there was a continuous decrease until, in 1918, the shipments were approximately only 2,215,201 tons.

The coal arriving in Japan during the same period totalled 4,192,487 metric tons. The yearly figures show great irregularity. The 1913 imports were 576,772 tons; those of 1914 jumped to 614,677 tons, and in 1916 a further shrinkage to 556,110 tons. There was a substantial upward movement to 713,080 tons in 1917, and the country's receipts of coal from abroad were again enlarged in 1918, when 774,189 metric tons were imported.

1,187 Ships Built in First Half of 1919

During the first six months of the current fiscal year, beginning July 1, 1919, the output of American shipyards was 1,176 vessels of 2,213,448 gross tons, not including 11 vessels of 17,000 tons built for foreign owners. The output consists chiefly of vessels built with funds from the United States Treasury for the Shipping Board and is the United States' largest output for a six-month period.

Oil Fuel Projects in South Wales

There are signs that Lord Fisher's prophetic vision of the general adoption of oil as fuel for steamers may find speedier fulfilment.

Anthracite Shipments for December, 1919

The shipments of anthracite for December, 1919, as reported to the Anthracite Bureau of Information at Philadelphia, made the largest record for that month since 1915. The tonnage sent out in December, 1919, amounted to 6,138,460 gross tons, against 5,971,671 tons in November, an increase of 166,789 tons, and, as com-

pared with December, 1918, when the shipments were 5,736,260 tons, a gain of a little more than 400,000 tons. As compared with 1916, the latest normal years, the shipments in December showed an increase of something over 550,000 tons. Shipments by initial carriers for December, 1919, compared with December, 1918, were:

Railroads	December 1919	December 1918	Coal Year 1919-1920	Coal Year 1916-1917
Philadelphia & Reading Railway.....	1,442,571	1,040,645	10,741,052	9,424,306
Lehigh Valley Railroad.....	1,057,627	964,007	9,689,287	9,038,756
Central Railroad of New Jersey.....	506,840	527,080	4,798,731	4,781,181
Delaware, Lackawanna & Western Railroad.....	907,119	953,565	8,109,167	7,875,133
Delaware & Hudson Company.....	674,172	591,874	6,068,559	5,368,560
Pennsylvania Railroad.....	414,155	449,052	3,747,576	4,114,390
Erie Railroad.....	679,827	634,190	5,801,163	5,609,681
New York, Ontario & Western Railway.....	171,465	147,007	1,535,828	1,431,156
Louisville & Nashville Railroad.....	284,684	275,329	2,619,218	2,025,214
	6,138,460	5,582,787	53,110,381	49,668,357

fillment than has been generally expected. In view of these possibilities, considerable importance attaches to some recent commercial developments.

An agreement was recently entered into between the Scottish-American Oil Co., and Messrs. L. Gueret, Ltd., one of the most important coal-exporting firms in Great Britain, with coaling depots at ports in France, Algeria and South America. It is felt that the price of coal will remain high for a long time and that bunker supplies will not be so steady as in the past. Under these circumstances Messrs. Gueret feel it imperative that their various coaling depots should be able to offer oil as well as coal to ships.

Messrs. Williams, Corey and Son, coal distributors, have entered into arrangements with leading shipping and oil firms with the object of using their widespread organization for oil distribution. It is suggested that there may be some dramatic surprises in the next few months, for events are moving rapidly. The steady boom of the shares in William Cory and Son is one indication.

William Cory & Son, Ltd., represent an agglomeration of interests connected with the distribution and selling of coal. The company was registered in its present form in 1896 to take over the English business of coal factors, merchants, lightermen, etc. of a number of firms.

The result of various transactions is that the company, besides holding a commanding position in the home trade, has very large bunkering steamships at foreign ports. So important is its position in this respect that it is generally understood that it is now largely bound up with the P. & O. Co., which holds a considerable proportion of its capital. Dividends have ranged from 8 to 10 per cent, of which one-half was paid tax free.

Britain's Coal Output in 1918

The total value of the minerals raised in Great Britain during 1918—the figures for which are only now available—amounted to £257,079,792, an increase of £33,145,803, as compared with 1917.

The total output of coal was 227,748,654 tons, and the value £238,240,760, showing a decrease in output of 20,750,586 tons and an increase in the value of £30,433,866 on the figures of the previous year. The average price of coal for 1918 was 20s 11.06d. per ton, and for 1917 16s. 8.08d. per ton.

The quantity of coal exported, exclusive of coke and manufactured fuel, and of coal shipped for the use of steamers engaged in foreign trade, was 31,752,904 tons. Of these, France received over 16½ million tons, Italy over four million tons, Egypt nearly 1½ million tons, Gibraltar over 1½ million tons, Norway over 1½ million tons, Malta nearly 1½ million tons, and Sweden and Norway each over 1 million tons.

The amount of coal remaining for home consumption was 184,358,158 tons, or 4.385 tons per head of the population; 39,954,974 tons of coal were used in the manufacture of coke and briquettes, as compared with 40,981,757 tons in 1917; and 2,806,840 tons of coal and 11,286,680 tons of coke, which together are equivalent to 21,417,973 tons of coal, were used in the blast furnaces for the manufacture of pig-iron as against 2,816,318 tons of coal and 10,961,734 tons of coke, or a total equivalent of 21,085,875 tons of coal in the previous year.

During the past forty-six years (1873-1918) 9,192,072,000 tons of coal have been raised, and of this amount 2,219,868,000 tons, or more than 24.1 per cent of the total production, have been shipped abroad as exports in the form of coal, coke, and

manufactured fuel, and as coal used for steamers engaged in foreign trade.

The percentage of the output of coal shipped abroad in each quinquennial period from 1873 to 1917 and the percentage for the year 1918 was as follows:

	Per Cent
1873-1877	13.8
1878-1882	16.1
1883-1887	19.0
1888-1892	21.2
1893-1897	23.0
1898-1902	25.7
1903-1907	29.5
1908-1912	32.4
1913-1917	26.16
1918	19.1

Of the metallic minerals raised in the United Kingdom iron ores is by far the most important. During the year the output of ores of this metal was 14,613,052 tons, valued at £7,106,656. The ore yielded 4,581,772 tons of iron, or more than half of the total quantity of pig-iron made in Great Britain.

Nitti Shudders at Italy's Plight

Premier Nitti, in a speech to the Senate shortly before his departure for Paris, said he was quite certain Europe could not expect any more financial assistance from America. Consequently, he added, Italy must be prepared to stand almost alone.

"We are in a situation which makes one shudder," he said. "Coal, which before the war cost 30 lire a ton is now more than 600 lire. A pound of coal is now worth more than the pre-war price of a pound of rice. Italy must depend almost exclusively on her own resources since in September last not only the foreign Governments but foreign banks refused her credit."

Coal and Coke Exports from the Port of New York in 1919 Compared With 1918

In 1918 the total amount of anthracite that was shipped from the port of New York was 82,477 tons which valued \$584,087, as compared with 70,984 tons shipped in the next year (1919), amounting to \$624,809.

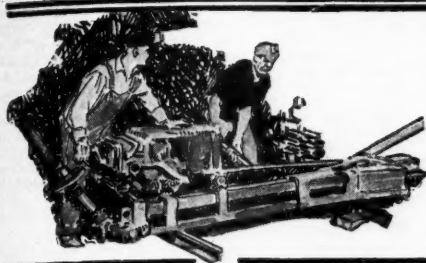
In 1919, \$200,706 worth of bituminous coal was shipped which was the value of 29,286 tons. Italy, Danish West Indies and the

Netherlands received the largest amount of this coal as compared with shipments to other countries.

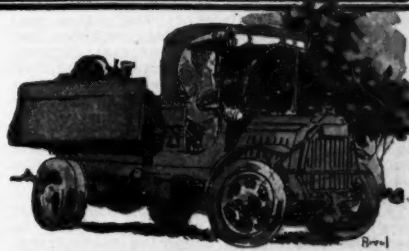
The following table shows the tonnage, value and countries to which anthracite, bituminous coal and coke were shipped from the port of New York during 1919, and for purposes of comparison the same figures for the year 1918.

Coal and Coke Export Shipments from the Port of New York

	Anthracite				Bituminous				Coke			
	1918	1918	1919	1919	1918	1918	1919	1919	1918	1918	1919	1919
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Argentina.....	50	\$500	25	\$275	3,750	\$27,471	2,892	\$20,660	1,219	\$28,422	76	\$1,285
Austria.....			185	2,248			212	1,585			497	4,765
Barbadoes.....	137	1,965	304	4,764	225	1,734						
Belgium.....							200	1,300				
Bermuda.....	229	2,102	131	1,360			50	550	100	2,800	4	102
Brazil.....	482	3,736	1,691	13,757	29,065	207,022	1,620	12,492	54	1,630	513	7,749
British Guiana.....			30	474					15	420	23	480
British So. Africa.....									2	56		
British West Indies.....					192	1,770	524	4,223				
Canada.....	68,763	482,834	46,570	402,787					132	2,045	348	6,910
Chile.....			50	850	14	145	170	1,545	66	1,570	35	898
Colombia.....	36	503	207	1,280	20	290			45	1,400	35	1,107
Costa Rica.....	1	23			1,776	16,808	390	2,353	151	4,387	362	8,842
Cuba.....	4,469	37,959	91	1,295			4,268	28,108	7	231	2	35
Danish West Indies.....							435	2,392				
Denmark.....					2,408	17,875	851	6,383			100	2,632
Dutch East Indies.....									99	1,925	60	1,473
Dutch West Indies.....							1,500	10,500				
Ecuador.....												
Egypt.....												
England.....	220	1,508			3,565	20,854						
Falkland Islands.....							681	4,053	7,140	79,940	4,791	71,452
France.....	4	40	2,527	29,297	10	80			191	4,955	54	1,720
French Guiana.....							3	15				
French West Indies.....			20	217			300	1,400				
Germany.....									5	182	27	701
Greece.....			2	34	20	123					2	25
Guatemala.....							4,430	32,376	427	8,200	6,024	40,459
Haiti.....	260	1,950	421	3,237			11	91	2	38	55	1,210
Italy.....	10	210	5	42	60	600	376	4,345	157	4,565	94	2,236
Jamaica.....			183	1,645								
Mexico.....			1	12			4,468	24,519				
Miquelon.....					152	875	2,600	19,175				
Netherlands.....	5,487	43,246	9,279	81,556	107	1,220			10	275	3	60
Newfoundland.....							1,176	6,900			327	6,216
Nicaragua.....			2	50					2	50		
Norway.....			81	947			1	14			15	366
Other British West Indies.....					247	1,456	100	355	742	22,043	3	115
Panama.....	10	90					130	2,455	144	4,048	287	7,860
Paraguay.....			400	4,500								
Peru.....			204	1,671			316	2,370				
Philippine Islands.....									5	135		
Porto Rico.....									75	2,149	17	429
Salvador.....									37	769	62	1,300
San Domingo.....	1,089	7,421	7,488	64,090	3,988	28,296	702	4,223				
Spain.....			680	4,150			600	3,660				
Sweden.....			100	1,200								
Trinidad.....			2	30	57	586	75	853			12	155
Turkey in Asia.....			101	1,285								
Turkey in Europe.....			201	706			200	1,700				
Uruguay.....					2,550	18,800			75	756	18	140
Venezuela.....			2	25	510	3,350	6	125	25	682	564	15,304
Total.....	82,447	\$584,087	70,984	\$624,809	48,727	\$349,369	29,286	\$200,706	10,937	\$173,674	14,410	\$186,026



COAL AND COKE NEWS



Charleston, W. Va.

Number of mining communities in grip of influenza. Would have cut production if there had been cars to load. Many mines idle more than two-thirds of week. Export permits not to be granted for present. Whole situation so unsettled, little done on next year's contracts. Influenza most serious on Cabin Creek and Coal River in Kanawha field. Worst car shortage in New River region for last two years.

While serious inroads would have been made on the production of coal in this section of West Virginia, during the first seven days of February, owing to the fact that a number of mining communities were in the grip of the influenza epidemic, yet the appearance of that disease had less effect on production than would otherwise have been the case, owing to the fact that there were no cars to speak of into which to load coal. The car shortage, in fact, in the areas covered by the Chesapeake & Ohio, was more discouraging than was even the case during the last week of January. Between 1,200 and 1,300 cars was about all the road was able to place on an average throughout the week, with the possible exception of Monday, when cars were equal to about 85 per cent of requirements. The general average supply for the other five days of the week was about 33 per cent.

In many instances mines were idle more than two-thirds of the week, and in some cases no cars were secured by mines until the very end of the week. Not only was the supply of cars on the Chesapeake & Ohio almost down to zero point but the supply on the Kanawha & Michigan was equally meagre, as was also the case on the Kanawha & West Virginia. Of course production suffered to some extent in the New River field owing to the strike there, but, even when that was settled, there was no increase in production because there were no cars to load.

Promises made by executives of the Railroad Administration at Washington, for improvement in transportation facilities, had given rise to the hope that there might be more cars available, but the benefits promised failed to materialize, nor did there appear to be any prospects of improvement. Operators in this area found it difficult to understand why there should be such an acute car shortage, in view of the fact that there was no congestion on the Chesapeake & Ohio, yet not only was the supply limited, but at the same time some operators at least were notified that no more permits (for the time being) would be granted as to exports. Otherwise no embargoes were in effect as to the shipment of coal from this section.

Producers were running far behind as to contract deliveries, although customers were demanding that they be given at least a portion of their fuel supply, a demand with which it was impossible to comply. Not only has the transportation breakdown affected operators adversely from a financial standpoint, but it has caused much friction between them and their customers, and it is said the present situation will have an important bearing on the making of contracts for next year. The situation generally is so unsettled that little has been done toward arranging for next year's contracts.

Mines in the Kanawha field at the outset of February labored under the double handicap of a car shortage and sickness. The car shortage was, however, more general than the influenza which incapacitated many miners for work. It had not appeared in as severe a form as during 1918 and it had just begun to make its presence felt during the first week of February, the greatest number of cases being reported on Cabin Creek and on Coal River. There were at least 100 cases of influenza, however, among the miners at Sharon, on Cabin Creek.

Of course with cars scarce, a reduction in working forces made less difference than

would otherwise have been the case, and cars were indeed extremely scarce in the Kanawha field during the period already mentioned—more so than during the previous week. In fact the general average covering the week was in the neighborhood of 33 per cent, the inevitable result being suspension for several days at a time at the majority of plants in the region. Production on the third was about 24,000 tons but by the middle of the week loadings were down to 10,000 tons a day, although there was a slight recovery on the sixth. For some reason not explained, permission to export coal from the Kanawha field was withheld. No embargoes were in effect, however, at least during the greater part of the week. Operators stated that they believed there were less loads on the line of the Chesapeake & Ohio than at any time in six months.

While a strike in force in the New River field might have accounted for the greatly restricted production in that field during the first half of the week ended Feb. 7, yet it had nothing to do with the greatly curtailed production during the latter half of the week for the strike had been called off. Nevertheless, even under the changed status of affairs and with miners ready to report for work, there was no increase in production, unless possibly it was on the seventh, owing to the most pronounced scarcity of cars yet felt in the New River region during the last two years. The strike referred to was adjusted through a return to the "check-off" and "closed-shop" system in the New River field, miners agreeing to go back to work, but as stated it had no effect on production. With the car supply averaging a little more than one-third of normal, there was much idleness among the mines in the New River section. New River shipments, for instance, on the fourth reached a total of only 12,850 tons and on the fifth shipments amounted to only 9,000 tons. With total shipments so small, naturally little coal was going to tidewater for export, nor to domestic markets either for that matter. The existing unstabilized conditions of course have left the contract situation for the coming year very much up in the air, mines being far behind with deliveries for the current coal year.

Fairmont, W. Va.

First week of February sees worst car shortage in northern West Virginia since winter of 1917-1918. Some 161 mines idle in Fairmont region alone. Influenza interfered with train operation. Railroad fuel contracts must be completely filled before all other contracts are honored. Operators fear wholesale confiscation by Baltimore & Ohio.

Pessimism among the operators of the northern West Virginia mining regions was much in evidence when the worst car shortage observed since the winter of 1917-1918 developed in that part of the state during the first week in February. It had been believed that the supply could be no worse than that furnished during the final week of January, but there was a more alarming shortage at the opening of February than has been witnessed at any time during the last year.

There was a fairly adequate supply on Monday, Feb. 2, but by Wednesday the supply had slumped to 25 per cent, and there were, for instance, in the Fairmont region on that date only 341 cars available. From that time until the end of the week the supply was such as to daily increase the number of idle mines. Wednesday, the fourth, saw 140 mines shut down. The following day only 373 cars were available and 132 mines had to suspend operations. There were only 453 cars available on the sixth, with 131 mines not able to operate. With only 425 cars available, there were 161 mines in the Fairmont region alone unable to operate. The same conditions prevailed elsewhere in northern West Virginia and producers were becoming des-

perate, while at the same time miners were unable to earn enough to meet their living expenses.

While the influenza had not affected mining operations to any appreciable extent, limited as they were, yet it had interfered with train operation; railroads in the northern part of the State were reporting a shortage of crews, so that there is a possibility that if loadings had been anything like adequate, it would not have been possible to handle them with any degree of promptness.

Railroad fuel contracts must be filled before any other class of contracts, according to word received in the northern West Virginia fields, instructions to that effect having been received from Director General Hines. In other words, companies having railroad fuel contracts will be required to fill their entire railroad contract requirements before attempting to fill any commercial contracts; in order to enforce such instructions, railroads (it has been understood) have been directed not to accept billing, notwithstanding the marked shortage of cars. Operators charge that the railroads are resorting to this method of extorting their pound of flesh in preference to confiscation, which would require that coal be paid for at the price paid by other consignees. Protest has been lodged by the Northern West Virginia Operators' Association against the proposed plan of the Director General.

It is reported, however, that the Baltimore & Ohio has resorted to confiscation of coal for railroad use in some instances, and operators generally are apprehensive lest there be wholesale confiscation. There is a tendency, northern West Virginia operators believe, for the railroads to confiscate coal indiscriminately; this has not only resulted in much confusion but has worked a hardship in view of the inability of commercial consumers to secure even a small supply of coal. Shipments from all northern West Virginia points were extremely light during the first seven days of February, although customers were clamoring for supplies and there continued to be, as was natural, quite an acute demand.

Piedmont, W. Va.

Acute car shortage in Piedmont and western Maryland fields. U. S. Senators and Congressmen appealed to for relief. Miners leave coal fields in search of work.

Failure of the Baltimore & Ohio to move coal cars on its lines has resulted, it is charged by operators in this section and in western Maryland, in quite an acute car shortage; a shortage so serious in fact that producers have found it necessary to appeal to U. S. Senators and members of Congress for relief. Until the loaded cars, which now almost choke sidings, are moved, operators contend, it will not be possible to secure an adequate supply owing to the lack of empties available. With cars so scarce, lines have been working on a half-time basis, this having resulted in a wholesale migration of miners from the coal fields of this section to Akron, Ohio, and Detroit, in search of employment.

Norton, Va.

Railroads confiscating 60 to 70 per cent of coal produced in Virginia. Protests filed. Coal production dropping from week to week. Labor affected.

Wholesale confiscation of coal is being resorted to at mines in Virginia, the coal so taken being utilized as railroad fuel. The railroads, in other words, are confiscating from 60 to 70 per cent of the coal produced in this section for fuel, and this autocratic exercise of power, which the operators claim is not vested in the railroads, has created widespread indignation throughout the Virginia mining fields; the result has been the filing of rather sharp protests with the Railroad Administration,

none of which appear to have done much good. The railroads have resorted to the practice of going direct to the mines and of helping themselves to fuel, without regard to the rights of commercial customers; refusing to accept commercial billing. There was a decline in production in the Virginia fields during the week ended the seventh, owing to a growth in the car shortage, the production dropping from 176,000 to 160,000 tons, a loss of 45,000 tons being attributed to a scarcity of cars. The percentage of loss from lack of cars is being increased from week to week.

The labor situation has been and is still being affected because of the fact that the operation of mines is becoming more irregular, this making for a feeling of unrest.

Ashland, Ky.

Production gains slightly in northeast Kentucky, but output only 40 per cent of capacity. Car shortage still serious. Operators desperate. Railroad Administration introduces "overage" adjustment in car distribution. Influenza cripples operations at one or two points. Kentucky legislation noted.

Slight gains were recorded in the northeast Kentucky district during the first week of February, but the car shortage was just as large, in proportion to total production, as it had been in previous weeks. The output reached 106,700 tons, that representing 46 per cent of a total potential capacity of 232,000 tons. During the week ended January 31, production amounted to 91,000 tons or only 40 per cent of capacity, so that there was a gain of 15,000 tons or about 6 per cent. The total loss was cut down about 12,000 tons, or from 137,000 to 125,300 tons. Yet of that loss the car shortage was responsible for 122,000 tons or 52 per cent all told.

During the first week of February, 1919, the total production was 112,070 tons, but at that time "no market" losses were the principal handicaps against a full production, so that last year's loading cannot be taken as a criterion of conditions. As perhaps illustrating somewhat more clearly just what conditions existed during the week ended the seventh, out of a total of 918 mine-days, there were 500 mine-days when mines were without cars.

Transportation facilities afforded mines in the northeast Kentucky field continue to be so poor that operators in that field are becoming desperate. They cannot conceive why it is that after three weeks of normal weather, there still should be such a pronounced shortage, as no reasonable excuse exists for such a shortage any longer. Repeated attempts to secure relief from the Railroad Administration have failed, and the stage has been reached where they cannot even secure acknowledgments of communications addressed to this Federal department.

Complaint is general in the northeast Kentucky field that operators are being penalized and discriminated against through adjustments of what the Railroad Administration is pleased to call "overage." In other words, at a time when every car is precious, the railroads are deducting from the supply, for excess cars furnished the mines during the "no market" slump, during the shopmen's strike and at other periods when cars were not so badly needed; yet for these conditions the mine owners were not responsible. For instance, 900 cars were deducted from the January supply, to cover "overage" for November and December, or the period of the strike.

Influenza has reached the northeast Kentucky field and has seriously crippled operations at one or two points, being complicated by other diseases. The epidemic appeared in its worst form at Seco, Ky., where the Southeast Coal Co. has a splendid plant. While here three nurses had been secured, it had not been found possible to secure the number of physicians desired.

Bills had been introduced early in the second week of February in both branches of the Kentucky Legislature, proposing a production tax of 2c. a ton on all coal produced. Measures are also now pending having for their object an increase of 100 per cent in the Workmen's Compensation rates. Still another bill has been introduced making the construction of wash-houses compulsory.

Dallas, Tex.

Increased output of northern central Texas mines since strike settlement. Railroads taking greater part of output. Fuel shortage at communities near mines. Great development of Texas lignite in next few

years forecast. Predicted discontinuance of oil as fuel. Cheaper lignite to be substituted.

Bituminous coal mines in the Strawn and Thurber districts of Texas have increased their output since the settlement of the coal strike to such an extent that a total of 1,400 tons is being mined daily, according to reports from mines in these sections. At Thurber, coal is worked in only two shafts, and the daily output there is 900 tons, while Strawn is turning out 500 tons a day.

Most of the coal mined in these two districts is being contracted to Texas railroads, the Texas & Pacific and the Missouri, Kansas & Texas taking a large portion of the output. The Wichita Valley lines, the Abilene & Southern and the Roscoe, Snyder & Pacific are getting their coal supply from the Strawn district. Some of the coal is being sold for domestic consumption, but the output is far below the demand and many communities adjacent to the mines are experiencing fuel shortage.

Mines at Newcastle are also working at full capacity, but the supply from these mines is also being taken by railroads, the Rock Island using a large part of it. Little of the Newcastle output is reaching domestic users.

Great development of the vast lignite beds of Texas within the next few years is forecast by James Z. George, vice president and general manager of the Texas Chamber of Commerce. Mr. George, speaking before a gathering of business men from all parts of the state in Dallas, a few days ago, pointed out the great possibilities along this line and predicted early development of lignite mines in Texas.

"Twenty-three billion tons of lignite lie in a belt running from Texarkana southwest to the Rio Grande, and passing within a few miles of Dallas," said Mr. George. He added that any industrial community must have cheap fuel close at hand, and predicted that at no far distant date the use of petroleum as fuel would be discontinued. A cheaper fuel will be found, and that fuel will be the lignite taken from the vast beds in Texas. Mr. George said the time was near at hand when practically all industries in Texas would be operated with lignite.

PENNSYLVANIA

Anthracite

Pottsville—That the stubborn fire in the inside workings of the Wadesville colliery, of the Philadelphia & Reading Coal Co. has been conquered was evidenced on Feb. 1, when officials, protected with smoke helmets, entered the mine and found the last vestige of the flames extinguished. By tightly sealing the area that was burning, the fire was effectually smothered.

Bituminous

Uniontown—It is being freely reported around the Connellsville coke region that considerable stock of the Tower Hill Connellsville Coke Co., has lately been changing hands and it is thought that one of the large steel companies is responsible therefor. This is in line with the action recently taken by some of the steel companies to gain a foot-hold in the region. The Tower Hill company operates two large coal and coke plants in Fayette County between Uniontown and Brownsville. The main office of the company is in Uniontown.

Indiana—The Clearfield Bituminous Coal Corporation has under course of development and construction new mines at a town to be known as Commodore, in Indiana County. The new town will adjoin Lovejoy and is situated on the Dixonville & Cherry Tree R.R., which is an outlet for both the New York Central and Pennsylvania railroads from the western end of Indiana County. There will be two openings to develop the 5,000 acres of coal available and it is said that it will be one of the largest plants in central Pennsylvania. Power will be furnished from the company's central power plant at Sample Run.

Johnstown—At the annual meeting of the stockholders of the Imperial Coal Corporation, held in the Johnstown Trust Building, officers were named as follows: President, Charles A. Owen; vice president, James P. Thomas; secretary, Frank D. Baker; treasurer, Philip E. Thomas; general superintendent, James M. Cook; assistant superintendent, E. H. Zimmerman and assistant secretary Harry A. Ling. The directors re-elected are: Charles A. Owen, of Atlantic City; James P. Thomas, Philip E. Thomas and Harry A. Ling, all

of Philadelphia; Frank D. Baker and James M. Cook, Johnstown and E. H. Zimmerman, New York. The company was formed in July, 1919, by the merger of the Shade Creek, Diamond Smokeless, Cambria Smokeless and Imperial coal companies.

Brownsville—The Redstone Coal & Coke Co. has been organized as a subsidiary of the Wierton Steel Co. to operate the Thompson-Connellsville No. 1 coke plant at Republic, Fayette County, Pa., recently taken over by the former company. The Thompson-Connellsville plant is on Redstone Creek.

The Superior Coal Co., on the Monongahela R.R., in Fayette County, Pa., between Uniontown and Brownsville has been taken over by the American Coke Corporation; the latter company is controlled by the Reilly-Peabody interests of Pittsburgh, Pa., recently formed to take over the Orient Coke Co. and supposed to be holding this company in the interest of one of the large steel companies. The Superior company owns one large mine, but though located in the Connellsville coke region has no coke ovens.

Connellsville—Thousands of employees of the H. C. Frick Coke Co. and their families are to be inoculated against influenza and pneumonia. Already five of the company's doctors are at work and are meeting with gratifying success. Influenza has not yet gained a foothold in the coke region. Officials of the company hope, through inoculation, to prevent the slowing down of production which they feel would follow an epidemic. No charge is made for the treatment.

That only 44 fatal accidents occurred in the last two years in the mines of the H. C. Frick Coke Co., which employs about 30,000 men, was the statement made by William H. Glasgow, assistant superintendent of the Frick company at a big banquet given here. It was stated that the number of tons of coal mined by the Frick company, per fatal accident, is larger than any in the state with two exceptions—both small concerns. Mr. Glasgow said the accidents were preventable, due to poor judgment, bad practices and disobedience to the company's rules and state laws. A renewed campaign for safety was urged.

WEST VIRGINIA

Logan—About 30 officials and employees of the Lundale Coal Co. organized the Lundale Mining Institute at a meeting held at Lundale on Jan. 30. Practical problems in connection with mining will be discussed at monthly meetings. The officers of the temporary organization selected were: J. M. Schweitzer (general superintendent of the Lundale company), president; W. R. Foglesong, Jr., secretary.

Bluefield—Fire recently totally destroyed the tippie and fan house of the No. 1 mine of the Thomas Coal Co., on Crane Creek, in Mercer County. It was not learned just how the fire started. There was no interruption to operations, the company having a connection between its No. 1 mine, where the fire occurred, and its No. 2 mine, coal being removed through the mouth of the No. 2 operation.

Huntington—The annual meeting of officers of the Logan Coal Operators' Association was held here on Feb. 2, the principal feature of the session being the election of officers. The officers elected are as follows: J. J. Ross, of the Logan Mining Co., president; A. R. Belsel, of the Island Creek Co., first vice president; W. R. Thurmond, Thurmond Coal Co., second vice president; C. W. Jones, treasurer; W. P. Ellis, secretary. One of the principal features of the annual meeting was an address by J. D. A. Marrow, vice president of the National Coal Association, dealing with the general coal situation.

Charleston—The appointment of traffic managers for each of the several district coal associations in West Virginia has become necessary as a result of the continued serious car shortages. That such traffic managers would be appointed for the purpose of giving special attention to car shortages, ascertaining the causes thereof and taking the necessary remedial action, was the statement made on Jan. 30 by T. L. Lewis, secretary of the New River Operators' Association; the appointment of a traffic manager by the Kanawha Coal Operators' Association followed on the heels of Mr. Lewis' announcement. The association selected as its traffic manager, A. R. Yarborough, of Charleston, demurrage claim agent of the Kanawha & Michigan Ry. Mr. Yarborough entered upon the discharge of his duties on Feb. 2.

Grafton—The Tygarts Valley Mining Association was formed here recently, its membership including superintendents, mine foremen, fire bosses and others engaged in mining. The object of the institute is the study of mine problems and securing of greater efficiency in mining. The meeting was called by W. H. Sandridge, inspector of the Second Inspection District of West Virginia; both Mr. Sandridge and W. Samples urged the organization of an institute for the study of mining problems and to insure a greater degree of co-operation between mine officials and the West Virginia Department of Mines, not only in averting accidents but in bringing about improvements in mining methods. W. Samples was elected chairman of the association, W. H. Sandridge, of Grafton, president and J. R. Lennon, of Independence, secretary. The association will hold its second meeting on March 6, at Grafton, arrangements for that meeting being in charge of W. H. Sandridge, G. H. A. Kunst and J. R. Lennon.

KENTUCKY

Louisville—J. N. McCormick, head of the Kentucky State Board of Health, reports a light but general epidemic of smallpox in the Harlan fields of southeastern Kentucky, and is threatening to place a quarantine on the county to prevent spread of the epidemic throughout the fields. Mr. McCormick stated that his only reason for not embargoing the county was the drastic need for coal throughout the country. He charged that the mine operators are not co-operating properly, and are not showing proper interest in the situation. The influenza epidemic is getting worse in the larger cities of the state, but is not causing much trouble in the mine districts.

ALABAMA

Birmingham—Work on the \$3,000,000 plant of the Birmingham Coke & Byproducts Co. has been completed and the ovens were fired for the first time recently. Coke and chemical byproducts will not be produced for about a month, says the *Iron Trade Review*. The plant, which is located just outside of Birmingham, between Boyles and Tarrant City, is to be the center of a big industrial section, as a number of industries which will use the coke and byproducts of the ovens will locate on the land reserved especially for that purpose by the owners of the Birmingham Coke & Byproducts Co. The plant now has 50 Koppers ovens, and was built so that 150 more ovens, in units of 50, may be added.

R. A. Terrell, a local capitalist and banker, has been appointed umpire under the Garfield agreement to pass upon questions of dispute between miners and operators in this district. Miners and operators presented to Federal Judge W. I. Grubb six names each, from which to make a selection. Mr. Terrell being on the coal-men's list. Mr. Terrell's appointment has been approved by Attorney General Palmer, but he has not yet signified his acceptance of the position. Judge H. C. Selheimer, former umpire, resigned on account of ill health.

At the semi-annual examinations of applicants for certificates of competency as mine foremen and fire bosses, held by the State Mining Board recently, certificates were granted to 29 first class and 20 second-class foremen and to nine fire bosses.

OHIO

Toledo—Some improvement in the congestion on the railroads at this place is reported by traffic officials. The more favorable weather that has been prevailing has enabled traffic men to move some of the loaded cars which have been blockading the Toledo gateway. But there is still bad congestion and embargoes on many of the roads entering Michigan still prevail. Special permits are necessary to ship to many Michigan points.

INDIANA

Evansville—The St. Bernard Mining Co., with mines in Webster and Hopkins counties, Kentucky, a few miles south of this city, has announced that a deal with Drexel banking interests of Philadelphia has been called off. The officials of the mining company state that the mine is not for sale. It was reported at one time recently that the Drexel interests would finance a large coal-mining deal in this vicinity.

La Fayette—The Monon Route handled 220 carloads of coal in its Linton district on a recent day, the largest in any one day in the road's history. Activity in this coal district has increased steadily since the mine strike ended. The Little Giant

and the Gould mines, two of the largest in the Linton field, have had an average daily output of 1,250 tons each since the big strike ended, and the Monon has been handling an average of 200 carloads daily in this time. The major part of this output is transported to points in Indiana, Illinois and Michigan. The Monon road requires for its own consumption, for stationary power and locomotive uses, from 25 to 30 carloads daily. The entire daily output of coal in the Linton field, including the two large mines mentioned and the 29 others, is averaging 11,000 tons, the largest in the history of the field.

Petersburg—An important deal in Indiana coal fields has been consummated at this place, the transaction involving the leasing of several thousand acres of coal land; the coming spring and summer should see increased activity in the coal fields of northern Pike County and southern Daviess and Knox counties. The oil development in this part of Indiana has brought to the attention of coal operators what is said to be one of the best fields in the Central West, with five workable seams. The seam here is said to average from 2 to 5 ft. in thickness. Thousands of acres of land underlaid by No. 6 coal is being bought for stripping purposes at from \$70 to \$150 an acre. Furthermore it is reported that 25,000 acres of land containing No. 5 coal has been bought in the last few months, the Pike County Coal Co. alone having purchased 10,000 acres. The American, Indiana Creek, Globe and other companies are leasing tracts of coal land. No. 5 coal is found at depths ranging from 80 to 150 ft., in seams from 5 to 11 ft. thick; and the coal is said to be free from gas. No. 4 coal is found in Pike County in seams ranging from 4 to 7 ft. in width, at depths ranging from 250 to 450 ft. No. 3 coal seams are found at a depth of 500 ft., and are from 10 to 14 ft. in thickness.

ILLINOIS

Belleville—Ninety miners have been enrolled in the free night school just organized at the Belleville Township High School. Thomas Wright, former county mine inspector, and a deputy state mine inspector, is the instructor. The purpose is to make miners more practical in their work. Sparrows and mice are being trapped to be used in testing gases encountered in mines. The chemists of the high school will prepare samples of carbon monoxide and other gases similar to those originating in mines, for experiments.

Duquoin—The Madison Coal Corporation, one of the big coal mining companies of Illinois, is planning to sink a new mine near Blairsville, seven miles southeast of here. Plans call for a steel tippie to be erected at the new mine, and all equipment will be modern. The mine will be served by several roads, including the Illinois Central and the Iron Mountain, both of which run close to the site. Construction work on the new mine, which has been planned, will begin just as soon as the weather opens up and it is expected that by fall the plant will be well under way. The company owns most of the coal, which will be mined, a small part being held under lease. The field where this mine is to be sunk is one of the best in southern Illinois, the large Kathleen mine of the Union Colliery Co., is only about four miles from the spot. Several weeks ago representatives of the Southern Gem Coal Co., of Chicago, optioned 6,000 acres of land joining the Madison tract, and it is said as many as three or four mines will be sunk in that district during the next three years.

Jesse Diamond, president, and Herman Rea, secretary of the Southern Gem Coal Co., were in this city recently taking options on 6,000 acres of coal land five miles southeast of town. It was stated that the options were being taken up with the view of sinking shafts on the property in the near future. The Southern Gem Coal Co., which was organized only last summer, now owns or has under option or lease many thousands of acres of coal land in Franklin, Perry, Jefferson and Williamson counties. The same company is also contemplating the purchase of the Victory mine at Tamaroa, ten miles north of here, owned by the Victory Collieries Co. This mine is now being operated successfully and the purchase of it by the Southern Gem will make that company the owner of five mines, all of which have been bought during the last six months, the other four being at Winkle, West Frankfort and two at Sesser, respectively. The land which the company optioned near this city is directly adjacent to the holdings of the Union Colliery Co., of St. Louis, on which was sunk the large Kathleen mine.

Extensive improvement have been completed at Mine 2 of the Franklin Coal & Coke Co., of Chicago, located at Royalton, south of here. Owing to power trouble the mine has, for the last few months, been using current furnished by the Central Illinois Public Service Co., but this power has proved unreliable, causing the company to install new generators. Two 100-kw. Ridgway engine-generator units have been installed and will be used in connection with two 200-kw. synchronous-motor generator sets which are located in the mine. The power will be used for mining machines and haulage motors. These installations are in a way only temporary; later on the company intends putting in two 400-kw. Ridgway engine sets which will furnish power for mines 1 and 2, and also for the city.

The Bell & Zoller Mining Co. is excavating a large reservoir at Mine 1 near Zeigler, the work of excavating being done by one of the largest machines in the country of the type which was used digging the Panama Canal. The reservoir is expected to hold over 1,000,000 gallons of water.

Obituary

George W. Erwin, 40 years of age, a prominent coal operator connected with the Midland Mining Co., of Perry County, in the Hazard field, Ky., died in New Mexico recently, where he had been endeavoring to regain lost health. The body was brought to Hazard for interment.

Horace T. Knight, formerly superintendent of the Madison district mines of the Keystone Coal & Coke Co., at Greensburg, Pa., died recently from influenza. Mr. Knight was 45 years of age. He was a graduate of Mercersburg Academy and Lafayette College. He had been in Greensburg 18 years.

Samuel Matthew Robins, for many years a prominent figure in connection with the coal mining industry of British Columbia, died on Nov. 4, 1919, in Devonshire, England, where he took up his residence after the Vancouver Island Coal Co.'s holdings on Vancouver Island passed into the hands of the Western Fuel Co. This happened in the year 1901. It was in 1884 that Mr. Robins took charge of the old company's business in this province making his home at Nanaimo, B. C.

Alexander Ewart, pitt boss in the Middlesboro coal mines, at Middlesboro, B. C., was murdered on the evening of Jan. 19. He returned to the mine to assist in straightening out some trouble the ropers were having with the cables. He had just reached his objective when a masked man stepped out from the darkness and discharged two revolver shots at him from point-blank range killing him instantly. Mr. Ewart had been engaged in the coal-mining business in the province for some time.

Personals

Edward Bottomley, superintendent for the Kathleen mine at Dowell, five miles south of Duquoin, Ill., has resigned to accept a more responsible position with the Peabody Coal Co. since the sinking of the Kathleen shaft, over two years ago.

Charles McKay has resigned as superintendent of the Republic coal mine of the Republic Iron & Steel Co., at Republic, Fayette County, Pa., effective April 16, 1920. He was succeeded by William Fowler, mine-foreman of the same mine.

W. Bruce Wagner, former county commissioner of Indiana County, Pa., has been appointed lumber and timber inspector for the Rochester & Pittsburgh Coal & Iron Co. Mr. Wagner's headquarters will be at Indiana, Pa.

H. M. Rogers has been named as store manager of the Consolidation Coal Company stores at Monongah, W. Va., having succeeded C. E. Bartlett, resigned; the latter was store manager for the company for a period of 23 years or until forced by ill health to resign.

J. B. Johnston, formerly manager of the ordinance department, Crucible Steel Co. of America, Harrison, N. J., has been appointed general manager of the Standard Scale & Supply Co., Pittsburgh, Pa. This company specializes in the building of railroad track scales, coal and heavy duty industrial scales.

W. G. Stanton has accepted a position with the Ohio Brass Co., of Mansfield, Ohio. For the last 20 years Mr. Stanton has been identified with the electric industry, having started with the General Electric Co. and remaining with this corporation for a period of 18 years in the testing, engineering and sales departments.

C. E. Jaycox, formerly connected with the Central Illinois Traffic Bureau, has been appointed to fill the position, made vacant by the resignation of Percy F. Kuhleman, as traffic manager for the Rudledge & Taylor Coal Co., Chicago. Mr. Kuhleman resigned recently to accept a position in the distributing department of the Sterling-Midland Coal Co., of Chicago.

Clarence Patterson has resigned as superintendent of the Revere, Pa., plant of the W. J. Rainey company. He has accepted a position with the Grasselli powder company. At a farewell dinner given by W. J. Rainey officials at their club rooms at Revere, Mr. Patterson was presented with a cash gift by the employees at the Revere plant.

Thomas D. Thomas, superintendent of the Lucerne mines of the Rochester & Pittsburgh Coal & Iron Co., at Homer City, Pa., has been promoted to the position of private mine inspector for all the mines of this company and its allied interests. F. R. Vinton has been made chief private mine inspector in charge of all the mines of these companies in Indiana and Jefferson counties.

Guy M. Freer, secretary of the Central Coal Association, has been appointed director of the National Industrial Traffic League, with offices in the Tacoma Building, Chicago. His duties will be to look after and protect the interests of shippers with the return of the railroads to private ownership. R. R. Glover, assistant secretary of the Central Coal Association, has been named successor to Mr. Freer.

James P. Burns, Jr., has resigned as assistant to George P. Bell, executive vice-president of the Northern West Virginia Coal Operators' Association. Mr. Burns' resignation was announced Feb. 6. He is succeeded by C. M. Stubbins, of Grafton, W. Va. Mr. Burns will take charge of a branch office of the Cortright Coal Co., of Pittsburgh, Pa., which is being opened in the Professional Building, at Charleston, W. Va. Mr. Stubbins was formerly superintendent of fuel loading in the Allegheny district of the U. S. Fuel Administration.

F. P. Truesdale, former division freight agent of the Pennsylvania R.R., with offices in Uniontown, Pa., has launched a coke brokerage business in Pittsburgh, Pa., under the name of the Snowdon Fuel Co. Associated with him in the new enterprise are G. H. Snowdon and C. L. Snowdon. Offices have been opened in the Oliver Building. Since leaving Uniontown more than a year ago, Mr. Truesdale has been engaged in the selling end of the coke industry for other firms and has now launched into business for himself.

Charles L. Snowdon, of Pittsburgh, is part owner and former president of the Snowdon Coke Co., operating near Brownsville, Pa., and his son George H. Snowdon, also of Pittsburgh, is part owner of the Franklin Coke Co., operating in Somerset County near Somerset, Pa.

Coming Meetings

Material Handling Machinery Manufacturers' Association will hold a convention Feb. 26 and 27, at the Waldorf-Astoria Hotel, New York City. Secretary, Z. W. Camer, 35 West 39th St., New York City.

Canadian Mining Institute will hold its annual meeting at the King Edward Hotel, Toronto, Ontario, Canada, on March 8, 9 and 10, 1920. Secretary, H. Mortimer-Lamb, 503 Drummond Building, Montreal, Quebec, Canada.

New York State Retail Coal Merchants' Association will hold its annual meeting Feb. 26, at the Pennsylvania Hotel, New York City. Executive secretary, G. W. Woodside, Albany, N. Y.

American Chemical Society will hold its annual meeting at St. Louis, Mo., April 13, 14, 15 and 16. Secretary, Dr. Charles L. Parsons, 1709 G St. N. W., Washington, District of Columbia.

New England Dealers' Association will hold its annual meeting March 24 and 25, at Springfield, Mass. President, W. A. Clark, 141 Milk St., Boston, Mass.

Pennsylvania Bituminous Mine Inspectors' Advisory Association. A meeting has been called by Thomas K. Adams, presi-

dent, of all the bituminous mine inspectors of the state, together with the other members of the mine foremen's examining boards, to be held at the Seventh Avenue Hotel, Pittsburgh, Pa., Friday, March 5.

National Retail Coal Merchants' Association. Executive meeting will be held in Philadelphia, Pa., March 5. Annual meeting is to be held in Detroit, June 10, 11 and 12. Secretary-manager, Ellery Gordon, Philadelphia, Pa.

Industrial News

Charleston, W. Va.—There is a movement on foot in this city among coal men of the New River, Kanawha, Winding Gulf and Elk fields, adjacent to Charleston, to erect a large office building here, such a movement having been planned at a recent meeting of the Charleston Coal Exchange.

Pittsburgh, Pa.—At a meeting of the board of directors of the Pittsburgh Coal Co., on Jan. 28, A. K. Oliver was elected a director to take the place of Henry R. Rea, who died recently, and James Carstairs, of Philadelphia, was elected a director to take the place of J. J. Fisher, who died some time ago.

Centrallia, Wash.—The Lincoln Coal Co., a new corporation, has taken over the mines of the Lincoln Coal Mining Co., at Galvin, west of this city. The mines at present have a daily capacity of 150 tons, but this will be increased to 500 tons immediately. The officers of the new company are T. E. Martin, president, and J. O. Humbert, secretary-treasurer.

Pittsburgh, Pa.—H. D. Mason, Jr., secretary of the Coal Mining Institute of America, announces that all material for the bound proceedings is now in the hands of the printer and that books will be mailed within the next month. A feature of this year's book will be the including in the proceedings of the banquet addresses.

Wheeling, W. Va.—Youngstown, Ohio, interests identified with a large new steel industry, it was announced here tonight, have acquired for \$1,250,000 the mines and 2,000 acres of Pittsburgh seam coal in Belmont County, Ohio, near here, from Burgess Lewis and the Industrial Coal Co. It is said that the property will be developed on a large scale.

Gordon, Pa.—The Hillone Coal Co., Scranton Life Building, of this place, in Schuylkill County, is having plans prepared for the construction of a new coal washery at its local operations. The structure is estimated to cost about \$25,000. Frank B. Davenport, Coal Exchange Building, Wilkes-Barre, Pa., is engineer.

Wilton, N. D.—The tippie of the Washburn Lignite Coal Co., at No. 2 mine, of this place, was recently destroyed by fire. The Roberts & Schaefer Co., of Chicago, was awarded the contract for the reconstruction work. A modern steel tippie, which will have incorporated in it a Marcus picking-table screen, will be erected.

Mallory, W. Va.—The Faulkner Coal Co., of this place, plans to start work at once on houses for its employees also to install motors and to be in the market for rail. The plant operates a drift mine and the improvements are estimated to cost \$150,000 when finished and the ultimate capacity of 500 tons a day is realized. S. E. Scholl is the superintendent in charge.

Toronto, Ont.—The Canadian National Railways will be arranging shortly for their supplies of locomotive and other fuel, for the coming year. Inquiries should be addressed to A. L. Graburn, General Fuel Agent, Toronto, Canada, quoting prices at the mines for lump and run-of-mine and giving present freight rates to Lake Erie points for water shipment and all rail rates to Toronto, Cobourg, Ottawa, Montreal and St. Hyacinthe.

Madisonville, Ky.—An option placed with the Drexel banking interests of Philadelphia, for the sale of the property of the St. Bernard Mining Co., with the largest operations in western Kentucky, expired on Jan. 30, and the St. Bernard people will continue operating the properties as heretofore. It is reported that an extension of the option was asked, but not given. The properties are said to be valued at \$2,500,000.

Mullens, W. Va.—With a branch of the Virginian Ry being projected from Mullens into the Laurel Fork region of Wyoming County, coal resources of that part of the county are undergoing rapid development. Not less than 600 miners' dwellings are being constructed near McGraw's post office. Development of the section named will materially increase the annual tonnage

of Wyoming County during the coming year.

Chicago, Ill.—The Edmund T. Perkins Engineering Co., announces the centralizing of all branches at the First National Bank Bldg., Chicago. Having a complete corps of engineers, this company is prepared to carry on a general engineering practice, including reports and valuations, irrigation, drainage, flood protection, river regulating, water-power and topographic mapping.

Wheeling, W. Va.—A deal has been closed by the Goodyear Tire & Rubber Co., of Akron, Ohio, it is understood, in the name of the International Coal & Coke Co. for 2,000 acres of coal land in eastern Ohio near Harrisville. The property is on a branch of the Wheeling & Lake Erie R.R., and the consideration is said to be between \$2,000,000 and \$3,000,000. Included in the purchase are going mines. Extensive improvements are contemplated with a view to materially increasing the capacity of the mines, and 1,500 houses are to be built for the use of miners.

Pana, Ill.—The Smith-Loehr Coal Mining Co., of this place, has contracted with Roberts & Schaefer Co., of Chicago, for a complete steel tippie and re-screening plant to be built at its mine at this place. The tippie will be complete with a Marcus picking-table screen, "Rands" shaker loading booms, and rock-disposal machinery. The plant will also have incorporated in it facilities for cleaning and crushing run-of-mine coal. The re-screening bins will be built of re-inforced concrete and steel, and will be equipped with special facilities for careful handling of coal into the bins, and the loading of coal into the railroad cars.

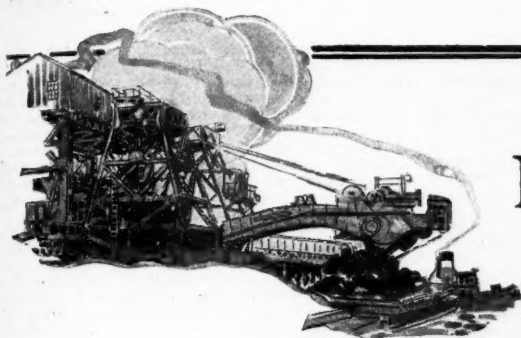
Charleston, W. Va.—Having taken over leases covering 10,000 acres of coal land in Greenbrier County, in the smokeless area, Charleston coal men and others have also secured control of the Greenbrier & Eastern Ry. and have reorganized that road, John B. Lang, of Lewisburg, having been elected president. The company is evolving plans now for the development of land under lease. Those associated with Mr. Lang in this venture are: W. E. Deacons, of Hinton; A. B. Crichton, of Charleston; J. W. Bell, of Bellwood; Henry Blackman, W. S. Wood and Quin Morton, of Charleston.

Pittsburgh, Pa.—Colonel G. A. Burrell, formerly Chief of the Chemical Warfare Service, U. S. Army, has organized the Burrell Technical Supply Co., with offices in the Chamber of Commerce Building, Pittsburgh, Pa. Colonel Burrell is president of the company, the other officers being: J. T. Ryan, vice president; G. H. Delke, treasurer; G. C. Nelms, secretary. The personnel also includes G. H. Burrell, E. H. Kellogg and R. P. Mase, formerly Chemical Warfare Service men. The company will conduct a general laboratory and technical supply business and will issue catalogues in the near future. Work on the new buildings in Pittsburgh, which will give this company greatly added facilities, is being rushed to completion.

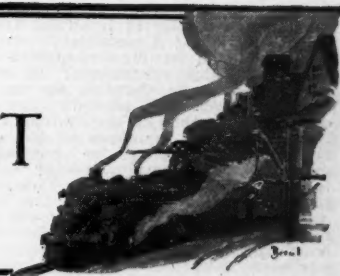
Chicago, Ill.—The Chicago Pneumatic Tool Co. on Jan. 21 and 22 held a general conference of executives, plant and branch managers and salesmen at its Detroit plant, on the occasion of the formal opening of a large five-story addition. At this conference the expansion program of the company for 1920 was outlined, calling for largely increased production not only at Detroit but at the five other American plants of the company. It was reported that much of the proposed increase in production was already absorbed by orders for future deliveries. The plan of nationwide chain of service stations which the company has opened and supplied with complete stocks of spare parts, machinery and tools and provided also with facilities for handling territorial repairs for users of the company's products, was also outlined in detail.

Nelsonville, Ohio.—The Echo Coal Co., of Columbus, recently chartered with a preliminary capital of \$10,000 has purchased the East Hill Coal Co., operating a modern mine on the Hocking Valley Ry. near this place. A modern tippie was erected last year. It is planned to increase the output from 300 tons to about 800 tons daily. The product will be handled by the Essex Coal Co., of Columbus. S. Cottingham is president and Fred Essex, secretary and treasurer of the company.

The operating mine of the Hazelton Coal Co., located near Nelsonville, has been purchased by the Essex Coal Co., of Columbus, which is operating it and selling through the Columbus office. The property is known as the old Gem mine. Harry Spencer was president and F. M. Spencer, secretary of the Hazelton Coal Co.



MARKET DEPARTMENT



Weekly Review

Operators Complain of Continued Car Shortage—Milder Weather Aids Distribution—Frozen Cars Prevent Dumpings—Demand for Both Bituminous and Anthracite Brisk.

MINE operators still continue to complain of their car shortage, especially in that district of Kentucky located along the Louisville and Nashville Ry. lines where the car supply has fallen as low as 10 per cent of capacity. Although the railroads have made an effort to improve conditions, they have not been able to remedy them materially.

Almost all the districts that were affected by the heavy fall of snow found other difficulties confronting them when the downfall ceased. The milder weather of the daylight hours thawed the snowy coating, making the coal wet and ready to freeze hard in the cold and windy nights. Once frozen through, it was almost impossible to dislodge it from the cars at dumping points.

When coal is frozen solid, as is the case with recent anthracite shipments in and around New York piers, unloading is delayed by the time required to put the coal through the thawing process, and this is especially annoying where inadequate thawing facilities are provided. Because of the ice in the river, boats in the harbor have also been held up. The only

possible solution of the tied-up condition is a spell of milder weather.

At Hampton Roads, there has been observed a slight improvement. Although the embargo on exports still continues to be enforced, bunkering is allowed to continue, and boats, where coal has been contracted for early, are loading what is considered a fair volume. This class of trade does not fall, however, to wholesale dealers.

Demand for bituminous coal has shown some slight signs of weakening in view of the possibility that milder weather may soon set in, but most of the coal now to be obtained is consumed by the railroads. Though the Railroad Administration is being besieged by representatives of the districts which complain of small stocks of coal, the railroads still continue to confiscate and divert shipments.

Diseases which have interfered recently with the activities of the coal industry have now become less prevalent, but while the number of cases of influenza has not been greatly increased, more deaths have been reported. Smallpox, both in Canada and Harlan County, Kentucky, still continues to be a menace.

The prices of bituminous coal are still those ordered as a maximum by the Government, and as a result there is not much coal offered in the spot market. More attention is being paid to contract consumers, on which the wage advance of the miner is added to the price. No decision has been reached by the commission investigating wages and prices in Washington, D. C.

Demand for anthracite has been satisfactory, but the dealers complain of poor deliveries. Local conditions such as cold and the snow prevent timely deliveries to the domestic consumer.

Expectations as to production were not realized in the Connellsville coke region for, although 413 ovens were added to the active list the week previous, these are being hampered in production because the coke cannot be removed from the oven wharves by reason of poor car supply. Operations throughout the Connellsville district worked practically with the same degree of halting uncertainty as during the week previous, iron and steel plants securing an inadequate supply of coke.

WEEKLY PRODUCTION

The weekly report on the production of bituminous coal, anthracite, and beehive coke, compiled by the Geological Survey, Department of the Interior, Feb. 14, 1920, states that the cumulative effect upon transportation of continued snow, sleet, and storms, caused the production of soft coal to decline again during the week ended Feb. 7. The total output, including lignite and coal made into coke, is estimated at 10,004,000 net tons, a decrease of 597,000 tons, or 5.3 per cent, when compared with the preceding week.

For the first time this year the line of current production has fallen below the curve of 1918, although it remains above those of 1917 and 1919. The output for the corresponding week of 1917 was 9,769 tons; of 1918, 10,424,000 tons, and of 1919, 7,946,000 tons.

The decline in production was admittedly due to transportation disability, which in turn was caused by continued bad weather. After a month or more of favorable weather in December and early January, an extended period of snow and cold set in. The week of Jan. 24 was marked by exceptionally heavy rain, snow, and sleet. It was followed by a cold wave affecting the Middle Atlantic States, and especially New England. During the week of Feb. 7, the falls of sleet returned, accompanied by high winds along the Atlantic Coast. Drifting snow blocked the roads and interfered greatly with rail transportation as well.

The production of beehive coke during the week ended Feb. 7 is estimated on the basis of rail shipments, at 433,000 net tons. This was a 9 per cent decrease when compared with the preceding week. The decrease was general throughout the principal producing districts.

That the demand for coke is still very active is evidenced by the willingness of blast-furnace operators to pay the dollar premium on 72-hour coke allowed in certain cases by the Government prices. Shortage of cars, particularly in the Connellsville region, is at present the limiting factor in the production of beehive coke. The total output since the beginning of the year now amounts to 2,410,000 tons, a decrease of 533,000 tons, or 18.1 per cent, when compared with 1919.

Atlantic Seaboard

BOSTON

New England embargoed. Wholesale confiscations continue. Extremely light movement all-rail. Coal Committee gets busy again. New York and Philadelphia piers short of supply. Hampton Roads situation shows slight improvement. Anthracite domestic sizes still in strong demand. Better request for steam sizes.

Bituminous—Following closely upon restrictions placed against the movement of

steam coal to tidewater, the Regional Director at New York announced a general embargo against all coal to New England all-rail, anthracite and bituminous, railroad fuel alone excepted. The reason given is that this territory has in transit a very large volume, ample for immediate needs, and that other sections are in greater need. Meanwhile, Governor Coolidge of Massachusetts has been exchanging telegrams with Mr. Hines, who has promised that everything possible will be done "to meet the situation."

Could New England steam users be assured that coal en route would be protected against seizure there would be measurable relief, but so far as we are advised there have been no steps taken in this direction. It was rumored that the Washington authorities were anxious that the railroads should not be in the position of turning over to private owners any larger reserves of fuel than would safely be required for this time of year, but at the rate coal has been confiscated the past four weeks for railroad supply one might suppose the roads were trying to stock for the whole spring. March 1 cannot come too soon, in the judgment of the trade, if thereby we shall have some relief from the fast and loose methods that have lately been employed.

It should be remembered that confiscations lately have also been in favor of large utilities, particularly those in the vicinity of New York City. The consumers have been at a decided disadvantage be-

cause of slow movement to the piers and the great difficulty in handling frozen coal.

The Sub-Coal Committee, for this district, is again issuing broadsides of advice and promising all manner of assistance, but to the trade there is apparent an increasing lack of co-ordination between different branches of the Railroad Administration. While members of the committee besiege Washington for increased shipments, the Regional Director takes steps to shut off what we have. The press gives prominence to efforts of the committee which were said to result in 70,000 tons extra from Hampton Roads for distribution to New England industries, but several of the agencies take serious exception to this. Coal at, or en route to the piers through usual channels and already destined for New England, with ships waiting, has now been seized for dumping into other ships for distribution in New England through other agents; wherein New England is the gainer is more than the trade can figure out. From the publicity given it might be supposed that 70,000 tons would run New England for at least four months.

Because of adverse weather and all the conditions incident to it there is great difficulty getting even a minimum of tonnage dumped over the Philadelphia and New York piers. At the latter the situation is very serious and, in spite of all efforts, only the most urgent requirements can be met. The piers are sadly lacking in thawing facilities and it is taking hours instead of minutes to dump cars. There is much confusion over permits for bunkering, and seizures of commercial coal are made regularly from day to day.

At Hampton Roads there is observed a slight improvement. Boats for New England are loading in four to six days and, so far as contracts are concerned, a fair volume is moving in this direction. Agencies who are confining themselves to bunker and export trade are giving no attention to this market, but yet they are more often the channels through which the authorities expect emergency coal will be satisfactorily distributed. On the Virginia roads there are the same difficulties with regard to car supply, but movement is much better than in Pennsylvania.

Anthracite—Retail dealers are still exerting pressure to get forward domestic sizes, especially stove and chestnut. Egg is not much in demand, although there are signs of better request for March delivery. Household trade is very active, but deliveries are difficult and for that reason stocks are not being moved as would otherwise be the case. It is apparent also that the larger dealers, especially, are making every effort to increase their receipts because of the probable advance in freights, both water and rail, when the railroads are turned back. There is reasonable certainty also that coal itself will cost more at the mines when the new adjustment is made in the spring. Discussion is once more general about a possible re-sizing. Some of the companies are considering this seriously and doubtless will fall into line, if it can be shown that the plan can be carried through uniformly with all the shippers. Retail dealers are generally in favor of the scheme and it only remains to be seen how the public will view the possible change.

Before the embargoes were put on the trade was developing a much better request for steam sizes. Some of the regular shippers of the junior sizes have fallen off in deliveries, and this has caused somewhat more inquiry than usual. There is nothing like the broad demand, however, that was anticipated and, this is another point in favor of the argument that the great urgency for bituminous in New England is really confined very largely to the railroads themselves.

NEW YORK

Shortage of anthracite possible unless improvement comes in harbor situation. Unloading at piers extremely slow. Dealers' yards becoming bare of domestic sizes. Embargoes resorted to for congestion relief. Bituminous—production very low as car shortage becomes critical. Some mines receiving only 10 per cent supply. Railroads running short of coal. Public utilities stocks also running low. Many plants closing for want of coal.

Anthracite—While there is plenty of anthracite coal at the various piers, dumping is being carried on so woefully slow that a shortage is beginning to be felt at tide-water destinations. Cars frozen solid with their coal at the piers are a detriment to prompt loading, and the time required for cars to go through the thawing process greatly reduces the volume of dumpings. Considerable congestion is going on at the piers. Boats have been waiting in line for cargoes many days, and any shipper with a loaded boat to offer, which is seldom,

can quickly secure premiums on egg down to the buckwheats.

From the dealers' viewpoint, all has been going out and little coming in. True, the disastrous condition of New York's main thoroughfares prevents large deliveries of coal, but nevertheless dealers are receiving less coal than they are delivering to householders, causing their stocks to become depleted. Stove and chestnut are particularly short, and stocks of egg coal, which retailers have been taking in order to secure prompt shipments of stove and chestnut, are now finding a ready market.

Last week the congestion at the piers became so marked that the Central Railroad of New Jersey placed an embargo on all shipments east of Bound Brook. At the same time, the Pennsylvania R.R. issued an embargo restricting all shipments east of Trenton.

Current quotations for company coals, per gross ton, at the mines and f.o.b. tide-water, at the lower ports are as follows:

	Mine	F.o.b. Tidewater
Broken	\$5.95	\$7.80
Egg	6.35	8.20
Stove	6.60	8.45
Chestnut	6.70	8.55
Pea	5.30	7.05
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00
Boiler	2.50	4.25

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—The greatest setback to increased production is the very poor car supply, which from week to week places the mines in a worse plight. Dispatches this week from the regions indicate that very little improvement is in sight. Many mines report that the total of their car supply for the week averaged around 10 and 15 per cent, while the majority has been approximately 25 per cent of normal, and the best to be reported has been around 50 per cent.

At the present rate of production, the railroads consuming their normal volume of coal could use the entire present production. Incidentally, the railroads are said to have but little coal on hand, and the large storage accumulations put by last fall are showing heavy signs of depletion.

At New York harbor the bituminous movement is very restricted. The handicapped condition of the piers is bringing a dangerously close fuel famine. Many of the smaller consumers who have been so unfortunate as to secure but negligible shipments during the past month, are on the point of closing down their plants. Some are resorting to the smaller sizes of anthracite coal, but to burn these satisfactorily over 50 per cent soft coal must be used, which many of the plants have not got. The bulk of the coal now being dumped at the piers is for the traction interests and public utilities who are having first call for coal in this territory.

No spot business is being carried on around New York. Bunkers are easily commanding their premium of \$1.35. Government prices prevail on all coal not shipped on contract, which are as follows:

	Mine-Run	Prepared	Slack
Central Pennsylvania.....	\$2.95	\$2.95	\$2.95
Western Pennsylvania.....	2.35	2.60	2.35
Fairmont (Gas).....	2.50	2.75	2.25
George's Creek, Upper Cumberland and Piedmont fields,	2.75	3.00	2.50

PHILADELPHIA

Anthracite retail deliveries held up by snow. Scarcity of large sizes gives pea slight boost. Premiums still effective on prepared coal. Consumers' stocks need replenishing. Pea wholesale price of pea cut. Car supply fair. Consumers place orders for spring. Buckwheat active. Steam size, rice and barley fair with prices cut. Bituminous trade in wretched shape. Car supply unimproved.

Anthracite—While the weather so far as temperature is concerned was far from rigorous, the dealers nevertheless have been severely handicapped on account of the great quantity of snow on the ground. The thermometer has been mostly above the freezing point, which softened the snow until deliveries were next to impossible to make. In addition it has been extremely difficult to keep the men at work under conditions wherein pretty nearly every load of coal has to be carried.

The demand from the consumer continues extremely brisk, with the burden, of course, being on stove and nut sizes. Due to the extremely slow deliveries from the mines quite a few dealers are at the lowest point on these sizes, and many a one has no

coal of these sizes at all. Yet with it all the tonnage received has been just about as much as the dealers could deliver.

With the stronger tone in the market for the three prepared sizes, the individual producers and brokers are still in position to demand good premiums on these sizes. Among the more conservative of the independents they are holding strictly to the 75c. differential over company, while other houses are asking prices around \$7.40 for egg, \$7.80 for stove and \$7.90 for nut. Even at these prices most of the smaller shippers are still insisting that pea accompany the larger sizes at the premium price. Oftentimes when shippers are hard pressed for orders on pea coal they are known to sell this size as low as \$5.40, and in some few instances there have been cuts about 25c. below that. However, in those cases it is believed to have been due to cars standing on demurrage, and quick disposition was necessary.

In the steam trade buckwheat remains the real active size. The big companies have about all they can do now to fill orders for this size, and the smaller shippers are less inclined to cut from the \$3.40 price. This has all been due to the bituminous situation being unrelieved. To a much lesser degree rice and barley have been affected. As a matter of fact the company price of \$2.75 on rice is frequently cut as low as \$2.40 and barley has been sold down as low as \$1.50.

Bituminous—The bituminous trade is in a wretched state. Stocks of coal which many consumers thought sufficient to carry them for long periods are dwindling fast, as new shipments fail to arrive. All the blame for the present situation seems to be placed against the car supply, although some producers are reaching the point where they openly declare this cannot be the sole cause and insist that mismanagement must be playing a part in the situation.

The point has now been reached where plants have been shut down for portions of the week from the lack of coal, and these have not always been the smaller plants, either. Public utilities, of course, are being taken care of, but in some instances only by the diversion of coal from other consignees. The situation has entered the serious stage and in various communities consumers have been taking joint action by appealing to the Government for relief.

If anything, less coal has arrived here last week than during the previous period. Prices for such coal as reaches the consumer are around \$3.30, as all of the production is being applied on contracts, where the wage increase applies. The only business at tide is bunkering, as the authorities still withhold permits for export business.

BALTIMORE

Very little government-priced coal but coal is offering here above the maximum on round that it is a "fair profit sale." Car supply and movement poor. Hard coal men talk of poor preparation and enter protest.

Bituminous—The market here is fairly tight but there is no real suffering. Coal is not in as liberal supply at tide as it was a week since, and there have been repeated diversions of coal from the terminals to all-rail points. For instance, the daily average of around 1,200 cars at Curtis Bay recently has been cut within the past week to 500 cars a day or less on reserve there. From the mining regions come reports of a car supply that runs as low as 30 to 40 per cent on some days.

While reports come of a big national production the movement east is far below normal because of poor car supply. The movement on the Baltimore & Ohio division has dropped to around 1,500 cars a day, or less, against the normal of some 3,500. The weather is now more open, however, and there has been promise of improvement from the Railroad Administration in response to some hot telegrams of protest from western Maryland, in which business men and operators declared that miners were deserting the regions by the score because they could not keep up work in the face of the poor car movement.

There is very little Government-priced coal offered and it is an acknowledged fact that some coal is offered for sale considerably above the Government maximum. It is claimed by some operators that their books will show that they can not sell coal at the Government price without a continued loss, and that, as the Lever Act provides for a fair margin of profit, they can sell at such a fair margin. Coal under this idea is offering in the open market at from \$3.50 to \$4.00 per ton.

No action has been taken by the government so far to prevent such selling. The export movement here is dying out

as the export permits expire. A few more loadings will terminate this permit list apparently, unless there is modification of the ban, and there are strong rumors that such modification is coming in a few days.

Anthracite—The hard coal dealers report that the supplies are now coming through fairly well. There is considerable complaint as to preparation by many operations. Many letters have been sent out of Baltimore on this subject, and it is learned that the National Retail Coal Merchants Association has been asked to aid in securing a better run of hard coal to this section. Lack of grading of sizes, burdensome slate runs and general lack of preparation in many cases is charged. The quality of hard coal coming here is called "worse than that received under the Fuel Administration in war days."

Eastern-Inland

PITTSBURGH

Coal operators are still looking for better car service.

There has been somewhat of a loss in coal production owing to the inability of the railroads to measure up to the car-supply situation, although there are signs appearing of some relief very soon. It had been hoped that at least a 70 per cent movement would be brought about, but this is not so, although buyers are picking up coal in fairly large-sized quantities.

While there is a larger volume of coal moving in the open market, buyers are not disposed to be satisfied with the tonnage or the quality either. With the approach of spring, when the weather conditions normally are better, and the fulfillment of promises by railroad men, added to the increased demand for consumption, an easy market condition is expected to develop. There is no change in the market quotations, as follows: Slack, \$2.10; mine-run, \$2.35; screened, \$2.60, per net ton at mine, Pittsburgh district.

COLUMBUS

Reduced output in all mining fields in Ohio is still reported. Car shortage and railroad congestion are holding down production to about 45 per cent of normal. There is a good demand for all grades.

No improvement in car supply is reported in any field of the Buckeye State and as a result production is still below the 50 per cent mark. Operators are making strenuous efforts to better this condition, but they are powerless, as the railroads are in bad shape as far as equipment and motive power is concerned. With prospects for a trainmen's strike, large steam users are trying to accumulate some surplus stocks, but conditions so far have prevented any special reserves, and many of the large users are operating from hand to mouth. The tone of the market is not satisfactory, although demand for all grades is good.

Domestic business is strong in every regard. Producers and shippers have a large number of orders booked on which they are unable to make shipments. Dealers' stocks generally are low, and in many localities retailers are compelled to limit orders to make the available supply go around. With a severe winter and the failure of the natural gas supply, demands from the householders have been quite strong. Consumption is estimated at 10 per cent over normal years and about 25 per cent more than last winter.

Deliveries have been hindered by the ice on the streets and roads but that condition is rapidly passing away. Retail prices are slightly higher, permitted by the higher cost of handling. Hocking lump is selling at \$6.50 while mine-run is quoted at \$5.75. West Virginia splints sell at \$7.25 for lump and \$7.75 for mine-run. Pocahontas lump is not offered, but mine-run sells in the neighborhood of \$7.50. Lump would be around \$8.25 if available. Pomeroy lump sells at \$6.50 and Jackson lump around \$7. Practically no anthracite is offered on the Columbus market.

CINCINNATI

Determination of the Mine Workers' Union to unionize the open fields of southern West Virginia may cause trouble and hamper production. This region, which furnished practically all of the bituminous coal for this territory during the strike and some time afterwards, comprises five of the largest bituminous fields in the country.

Operators are of the opinion that if the intention of the union is carried out, it will mean a general strike. The operators are determined, however, they will not submit

to the organization without a struggle, and for that reason it is almost certain trouble is ahead.

Every phase of production and shipments in Ohio at present is conducive to a large production, except transportation systems; the total inadequacy of the car supply is playing havoc not only with production but at the same time bringing the market and consumers nearer and nearer an acute shortage of coal. Not only was a serious car shortage still seriously crippling operations in the Kanawha field from which the local market draws the bulk of its fuel, but influenza made its appearance in certain parts of the region about the middle of the week and joined hands with a car shortage in cutting further holes in the output. It is hoped that conditions will improve next week.

Southern

LOUISVILLE

General demand good, but deliveries running low due to car shortage. Retail demand slackening off somewhat, and demand for block coal showing effect of mild weather. Steam coal active.

Kentucky producers are badly disgruntled over the continued discrimination in placing cars with the Louisville & Nashville Railroad, on the part of the Railroad Administration, which is resulting in steady shortages at the mines, and many mines are doing well to get in two days full time per week. Threatened suits against the Railroad Administration may bring some relief, but it is doubtful.

At the present time the operators have a demand that will take care of full production if cars are available. However, it is alleged that due to the discrimination they are unable to take advantage of the demand, and that it is injuring the market, and driving buyers into other fields. It is claimed that the operators in the Kentucky field are practically out of the market at a time when there is a strong demand which means that if they ever do get cars it will be at a time when other fields no longer need them and when there is no demand to keep them going.

BIRMINGHAM

Good market for all grades coal. Production and movement retarded by shortage of equipment for loading. Labor deficiency, caused in some instances by an unusual amount of sickness among mine workers, also cuts down output.

The requirements of the trade for coal from this district are holding up well and market conditions are active. Ample business is offered and in hand to take care of all the coal that can be mined and there is no delay in the movement of fuel except that occasioned by a shortage of cars. The Louisville and Nashville R. R. is furnishing a lower percentage of requirements than any other lines, and other roads have instructions to furnish a 75 per cent supply of equipment to mines on their rails, any surplus to be turned over to the Louisville & Nashville to bring up their average as much as possible.

The Tennessee Coal, Iron & Railroad Co. has been in the market lately for considerable tonnage, an effort being made to close some six-month contracts needed to supply the requirements of its furnace and other operations. This company has not mined sufficient coal for its needs for some months, and is now preparing to open "Hamilton Slope" on the Mary Lee seam, from which a production of 1,000 tons per day is expected.

Domestic trade is easy, receipts being light but sufficient to meet the requirements of the retail trade, which has been buying sparingly.

Labor at a number of operations in the district has been short and irregular the past week due to pay days and the prevalence of considerable sickness in the camps. The output for the week ending Jan. 31, as compiled by the Alabama Operators' Association, was 355,000 net tons, which was about 13,000 tons short of the previous week.

Lake Region

BUFFALO

Cars better distributed. Would have been much trouble otherwise. Storm troubles did not reach here. Enough trouble without them. Protesting against confiscation. Anthracite slow, but enough to go around.

Bituminous—The situation is slowly improving. Some shippers still fail to see any improvement, but the two weeks of soft weather must have its effect. This district did not get the big storm, and the snow is not deep here, but the wind and cold for a time made it difficult to move trains even here, so nobody wonders at the stoppage in places where the snow fell heavily to add to the difficulty. It is to be hoped that so many adverse conditions will not come together again right away.

Add to all this the fact that neither the coal output nor the car supply is up to the normal at the best and anyone will wonder why there was not real distress in many parts of the Northern districts. As it is it will be sometime, with good service, before the supply is really good. There is dispute as to the reason for the light movement from the mines. The Government authorities have said that the mining was light, but members of the bituminous trade agree generally that there would be more coal shipped if cars were to be had in plenty.

All bituminous prices remain on Government basis, \$4.70 for Allegheny Valley sizes, \$4.50 for Pittsburgh and No. 8 lump and three-quarter, \$4.25 for all slack, \$4.60 for smokeless, \$4.70 for Pennsylvania smithing, all per net ton f.o.b. Buffalo.

Anthracite—The trade is tranquil. There is no teasing for coal and there is not likely to be any, for spring cannot be far away and the idea is that the supply is sufficient, which means a great deal in the trade. At the same time, there has been some shortage at times, due mostly to the scarcity of cars and the storms. Sometimes the motive power would run short and the sidings would fill up with loaded cars. The true gauging of the state of the trade is in the way independent anthracite sells. As a rule the premium that can be obtained is small, sometimes nothing, though it was sometimes \$3 a ton before the public became convinced that there was coal enough.

The consumer complains of the high price of anthracite, but it is claimed by operators that prices have not advanced as much as in case with other things. It is observed here that gas-house coke, which used to sell for \$4.50, is now bringing \$9 a ton delivered. Experts say that the owners of anthracite mines would lose money unless present prices are kept up and that they are pretty sure to be higher before long.

It does not look as if there would be any anthracite surplus for loading into Lake vessels before spring. Heavy ice would be likely to prevent movements. The harbor was seldom frozen up as completely as now, especially as the usual winter grain fleet is absent, so that the work of navigating the ice has been less than usual.

TORONTO

Conditions in Toronto have not been satisfactory both to the dealer or to the consumer.

Most of the coal that is sold is largely to contract consumers. Cold weather prevents dumpings. Retail prices are as follows:

Anthracite, egg, stove, nut and grate.....	\$12.75
Pea.....	11.25
Bituminous steam.....	9.00
Slack.....	8.00
Domestic lump.....	9.00
Cannel.....	12.50
Wholesale, f. o. b. cars at destination—	
Three-quarter lump.....	6.75
Slack.....	6.00

CLEVELAND

Fuel supplies in this district are the lowest in months—not even excepting the period of the strike. Weather conditions are better, but inability of railroads to get cars back to southern and eastern Ohio mines is the sticking point. Steam coal prices have been advanced sharply.

Bituminous—Typical of the present stringency in steam coal in Cleveland and northern Ohio is the fact that the largest public utility company, always the first to have its wants taken care of, is down to a two-days supply. When the coal strike broke on Nov. 1 this interest had more than 50,000 tons stored. This reserve, it appears, has been all but wiped out, and the local coal committee is diverting to this plant a large part of the steam coal arriving in Cleveland. This has worked a hardship on industrials, and the number of plants operating on a day-to-day basis is larger than ever before. The trade so far has been enabled to keep all plants going, even if on a hand-to-mouth arrangement, but the cracking point appears to have arrived.

Domestic bituminous-coal prices stand, but steam coal prices all have been revised upward sharply on the basis of January sales. Generally speaking, slack is bringing around \$6 a ton, while mine-run ranges from \$6.30 to \$6.85, depending on whether it is for factory or other use.

Lake Trade—Great Lakes bituminous shipments in the season of 1919 went to the following districts, figures now show: Head of Lake Superior, 8,395,982 tons; Portage district, 776,194 tons; Fort William and Port Arthur, 1,357,943 tons; See river, 1,157,047 tons; Georgian Bay, 741,190 tons; Milwaukee, 3,109,226 tons; Chicago district, 1,811,310 tons; Other Lake Michigan ports, 1,763,711 tons; Lower rivers, 713,188 tons; and St. Lawrence river, 949,650 tons. Movement of this coal off the upper lake docks continues good, and the opening of navigation will see demand heavy, the head of Lake Superior will take at least 12,000,000 tons in the 1920 season, or over 3,000,000 more tons than in 1919, it is believed.

Pocahontas and Anthracite—Receipts of anthracite in the past week have been quite fair, the best in six weeks. Receipts of Pocahontas have been fair. Demand continues so large, however, that dealers still are rationing their supplies. Dealers have ceased quoting forked Pocahontas. With both anthracite and Pocahontas, the minimum of the spread is the ruling quotations, only small tonnages now bringing the maximum. This makes \$9 the market for shoveled lump and \$8 for mine-run Pocahontas, \$12.20 for egg and grate anthracite, \$12.40 for stove and \$12.50 for chestnut.

Prices of coal per net ton delivered in Cleveland are:

Anthracite—Egg, \$12.20@12.40; chestnut, \$12.50@12.70; grate, \$12.20@12.40; and stove, \$12.40@12.60.

Pocahontas—Shoveled lump, \$9.00@9.25; and mine-run, \$8.00@8.25.

Domestic bituminous—West Virginia splint, \$8.30; No. 8 Pittsburgh, \$6.85@7.00; Massillon lump, \$7.40@7.65; Cannel lump, \$11.00; and Coshocton lump, \$7.35.

Steam coal—No. 6 slack, \$5.75@6.00; No. 8 slack, \$5.80@6.00; Youghiogheny slack, \$5.95@6.10; No. 8, \$6.35@6.60; No. 6 mine-run, \$6.30@6.85; and No. 8 mine-run, \$6.30@6.85.

DETROIT

With the transportation outlook clouded by the prospective strike of the United Brotherhood of Maintenance-of-Way Employees and Railway Shop Workers scheduled for Feb. 17, Detroit consumers and the coal trade in Detroit find that the Railroad Administration has raised a new obstacle to free movement of bituminous.

Bituminous—From mines in the bituminous districts comes the report that an order has been issued effective from Feb. 7, forbidding the loading of coal for Detroit or Michigan, billed to pass through the Toledo gateway. As very little bituminous coal comes to Detroit by any other route, the order virtually cuts off shipments and amounts to an embargo. According to the information received by the Detroit trade, it is to continue in effect five days or longer.

It is an interesting detail that the existence of the order is not made known through representatives of the Railroad Administration in Detroit, but by notifications from the mines. While the congestion of freight on tracks in Toledo is given as the occasion for the order, jobbers are of the opinion that more coal is needed by the railroads, perhaps in preparation for the threatened strike.

Anthracite—With weather conditions moderate, the demand for anthracite has eased off somewhat. While some of the retailers have a fair amount, others are short of supply. Severe cold weather for a few days would likely create a demand from household consumers that would soon exhaust the supply.

Middle West

MIDWEST REVIEW

Coal market in the Middle West continues strong, in spite of the fact that we have had a spell of very mild weather. We have heard of one or two cases where retail dealers have cancelled high-priced orders placed before Oct. 30, but the number of cancellations coming in is so negligible it does not affect the market.

Manufacturers appear to be a little more comfortable, so far as coal is concerned, than they were a week or two ago. While but few steam users have a reserve supply of coal on hand, nevertheless they have

received enough coal during the past week or so to assure them of fairly good running time. Practically all of the buying which is done in this market lately is done by manufacturers, and steam users, rather than by the domestic trade.

The car situation continues to be the topic of the day. Old timers, who have been in the coal business for years, almost since coal operating was put on a commercial basis in Illinois and Indiana, claim that they have never experienced a time when the car supply was poorer. A statement came out in the Chicago daily papers a day or so ago to the effect that the railroads were going to discontinue the practice of pooling their cars, as soon as they were back under private ownership.

This statement met with great approval from the Illinois and Indiana operators, as in a great number of cases, especially in Illinois—and on the Chicago, Burlington & Quincy, for instance—the coal can be mined, and shipped out to western Iowa, without leaving the rails of the original road. This, of course, will mean a better car supply on some of our Western roads which tap the coal fields in Illinois, and at the same time extend in the West to Iowa, Minnesota and Missouri. The Chicago, Burlington & Quincy has been a loser under the car-pooling system. This road, before the war, had enough coal-carrying equipment to take care of its mines, while some of the other railways, serving the same territory, had but a meager supply.

CHICAGO

Retail trade complains that the public are buying but little coal. It appears that although the average householder has only a small supply of coal on hand, nevertheless he is unwilling to make additional purchases, at this time, as he perhaps believes prices are a little too high, and will be reduced soon.

Dealers think that if the railroad strike ties up the traffic of the country, there will be a great many householders whose homes will be too cold for comfort. The retail trade who buy most of the Eastern coal moving into this territory are beginning to realize that they will have to pay more for their West Virginia splint and Kentucky block than they have for some time.

It is stated that operators on railroads in the East, with tide-water connections, are having no difficulty in selling mine-run at figures as high as \$3.50 per ton for export. These mines, of course, prepare their coal which moves into the Western market, and which will now have to be sold around \$4.00@4.50 per ton, to compete with the export market.

C. M. Moderwell, general manager of the O'Gara Coal Co., McCormick Building, Chicago, has addressed the following letter "To the Trade." It is dated Feb. 8. It may be noted that the Government price for Harrisburg coal is \$2.55 f.o.b. mines.

"The Fuel Administration, acting under the Lever Law, granted the miners in the Central Competitive field an advance of 14 per cent in wages, and on Dec. 12 the miners went to work on this basis. Previously the Fuel Administration had fixed certain prices on coal, in the Central Competitive field, known as Government prices. This action was taken under the section of the Lever Law which reads as follows: "In fixing maximum prices for producers, the commission shall allow the cost of production, including the expense of operation, maintenance, depreciation and depletion, and shall add thereto a just and reasonable profit."

"Since the above action was taken, the Fuel Administration has ceased to function, and there is nobody to whom we can appeal to see that we receive a just and reasonable profit. This company has now had nearly two months' experience operating under this regulation. This experience has shown that we are not able to make a just and reasonable profit as provided by the law. Inasmuch as we have found that we cannot operate at a profit under the prices so fixed, and inasmuch as there is no regulatory body to whom we can appeal, we have decided to make the following prices, f.o.b. cars at mines, effective Feb. 9, and until further notice:

6 in. Lump...\$3.10 6 x 2 in. Egg...\$3.10
3 in. Lump... 3.10 3 x 2 in. Nut... 3.10
6 x 3 in. Egg... 3.10 2 x 1 1/2 in. Nut... 3.10

"Prices on other grades will be quoted on application. This letter is sent you so that you may have advance information as to our policy. If you desire to cancel any of the orders placed with us, please advise us at once; otherwise, please acknowledge receipt of this letter, and we will then ship and bill in accordance with the above prices. In this connection, we desire to say that we have considered this matter carefully, and are acting, as we believe,

entirely within our rights and are prepared to take full responsibility for our action."

MILWAUKEE

Scarcity of popular grades of coal and poor transportation conditions make business unsatisfactory. Coke advances in price.

The coal situation at Milwaukee and its dependent territory is far from satisfactory, owing to exhaustion of stocks and insufficient transportation facilities. There is a lively demand for coal, which dealers find difficult to meet.

The supply of anthracite is now limited to the egg and pea grades, chestnut and stove being sold out. Only mine-run Pocahontas is now available.

Coal prices remain unchanged, but coke has been advanced 50c per ton. Large sizes now sell at \$12.50 and pea coke at \$11.25. Mild weather conditions alone prevent the coal situation from being serious.

ST. LOUIS

Anticipated railroad strike creates steam demand temporarily. Domestic demand easy, generally speaking, on account of mild weather. Car supply averages about two days a week. Demand for everything that exceeds the supply.

Locally the St. Louis market is easy, excepting for an unusual demand for steam sizes. This is on account of the threatened railroad strike. If it were not for this, conditions would be easy. Mild weather prevails and the domestic call is lighter than usual.

Country demand for domestic coal is better than for steam, but steam sizes find a ready market in Chicago and the Northwest. In the Standard district the car supply averages two days a week on all roads. This, however, comes to the mines in half-day periods. The railroad tonnage still continues quite heavy.

The conditions in the Mt. Olive field are somewhat similar to those in the Standard district, although the car supply at times is somewhat better on some roads. Embargoes were effective at different times on the Western roads, caused by congestion of the St. Louis terminals. One of the principal reasons for the car supply in this territory is the lack of motive power and the failure to utilize the available motive power to its maximum.

In St. Louis proper no smokeless is coming in and practically no anthracite. Shipments of coke on commercial orders are unusually good. The wholesale prices are the same as last week.

Prices per net ton bituminous coal f.o.b. mine today, are as follows:

	Williamson	Mt. Olive	and Frank- lin Counties	Standard Stanton
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Prepared sizes (lump, egg, nut, etc.)...	2.55@2.70	2.55@2.70	2.55@2.70	2.55@2.70
Mine Run...	2.35@2.50	2.35@2.50	2.35@2.50	2.35@2.50
Screenings...	2.05@2.20	2.05@2.20	2.05@2.20	2.05@2.20
Williamson-Franklin rate to St. Louis is \$1.10, other rates \$0.95.				

Coke

CONNELLSVILLE

Connellsville region adds more ovens to active list, but under existing conditions as to car supplies there is no advantage gained.

Connellsville coke operators always have something to hope for, and at this time it is a better supply of cars. A policy of "quiet waiting" has been adopted, and patience is expected to be rewarded very soon, with the coming of better weather and a probable shakeup in railroad circles as soon as the roads are turned back to their original owners.

Figures last week did not bear out the prediction previously made of a further increase in production and larger movement of coke, but the signs this week have been more encouraging. For the first three days of the week car supply kept around the 50 per cent mark, a matter of 10 per cent better than the same three days of the previous week. Indeed, there were several days last week when the supply of cars dropped to 30 per cent, but the average was better at the end of the week. Demand continues as before.

BUFFALO

The complaint comes from the ore docks that movements are slow on account of the snow, so that shipments out by rail are light. Furnaces are running as strong as they can, for the trades report a bad shortage of supplies.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations compiled by the Matthew Addy Company:
Current One Month Ago

CINCINNATI		
No. 2 Southern	\$44.60	\$36.60
Northern Basic	42.80	31.05
Southern Ohio No. 2	43.80	31.55
NEW YORK , Tidewater delivery		
2X Virginia (silicon 2.25 to 2.75)	47.65	39.40
Southern No. 2 (silicon 2.25 to 2.75)	47.75	41.40
BIRMINGHAM		
No. 2 Foundry	41.00	33.00
PHILADELPHIA		
Eastern Pa., No. 2 x 2.25-2.75 sil.	45.35-46.35*	38.10*
Virginia No. 2	43.25*	39.10*
Basic	43.00†	34.60†
Grey Forge	42.50*	34.60*
CHICAGO		
No. 2 Foundry Local	43.25	36.25
No. 2 Foundry Southern	46.60	38.00
PITTSBURGH , including freight charge from the Valley		
No. 2 Foundry Valley	43.65	
Basic	42.90	34.40
Bessemer	43.40	35.40
MONTREAL		
Silicon 2.25 to 2.25%	43.25	

* F. o. b. furnace. † Delivered.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill	—New York—	St. Louis	Chicago
	Pittsburgh	Current	One Year Ago	
Beams, 3 to 15 in.	\$2.45	\$3.47	\$4.27	\$3.54
Channels, 3 to 15 in.	2.45	3.47	4.27	3.54
Angles, 3 to 6 in., 1/2 in. thick	2.45	3.47	4.27	3.54
Tees, 3 in. and larger	2.45	3.52	4.27	3.54
Plates	2.65	3.67	4.52	3.54

BAR IRON—Prices in cents per pound at cities named are as follows:

	Pittsburgh	Cincinnati	St. Louis	Birmingham
	4.00	3.50	3.44	4.25

NAILS—Prices per keg from warehouse in cities named:

	Mill	St. Louis	Chicago	Birmingham	San Francisco	Dallas
	Pittsburgh					
Wire	\$4.50	\$4.50	\$4.15	\$5.75	\$5.50	\$6.90
Cut	4.925	5.40	7.00		6.90	7.40

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Chicago	St. Louis	San Francisco	Birmingham
Standard railroad spikes 1/2-in. and larger	\$3.35	\$3.62	\$4.44	\$5.65	\$4.75
Track bolts	4.90-5.00	4.62	Prem.	6.65	7.00
Standard section angle bars	2.75	2.75	3.44	4.60	

COLD FINISHED STEEL—Warehouse prices are as follows:

	New York	Chicago	Cleveland	St. Louis
Round shafting or screw stock, per 100 lb. base	\$5.50	\$4.90	\$5.50	\$5.00
Flats, squares and hexagons, per 100 lb. base	6.00	5.40		5.50

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill	Cincinnati	Chicago	St. Louis	Birmingham
	Pittsburgh				
Straight	\$5.75	\$7.50	\$6.75	\$7.25	\$7.00
Assorted	5.85	7.50	6.90	7.50	7.25

Cincinnati—Horseshoe nails sell for \$4.50 to \$5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	—New York—	St. Louis	San Francisco	Dallas
	Current	One Year Ago	Chicago	
4 in.	\$70.30	\$65.30	\$70.70	\$72.80
6 in. and over	67.80	62.30	67.70	69.80

Gas pipe and 16-ft. lengths are \$1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	—Pittsburgh—	—Chicago—
	Current	One Year Ago
Standard Bessemer rails	\$45.00	\$55.00
Standard openhearth rails	47.00	57.00
Light rails, 8 to 10 lb.	2.585*	3.135*
Light rails, 12 to 14 lb.	2.54*	3.09*
Light rails, 25 to 45 lb.	2.45*	3.00*

* Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	\$28.00	\$26.00	\$27.00
Stove plate	25.00	30.00	25.00
No. 1 machinery cast	32.00	37.00	34.00
Machine shop turnings	15.00	12.00	14.50
Cast borings	18.00	15.00	16.50
Railroad malleable cast	25.00	29.00	24.00
Rerolling rails	33.00		
Relaying rails	50.00		

COAL BIT STEEL—Warehouse price per pound is as follows:

	New York	Cincinnati	Birmingham	St. Louis	Chicago
	\$0.10	\$0.16 1/2	\$0.18	\$0.11	\$0.15

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	14c.	13c.	15c.
Hollow	16c.		

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD					
Inches	Steel Black	Galvanized	Inches	Iron Black	Galvanized
1/2, 1 and 1 1/2	50 1/2%	24%	1 to 1 1/2	30 1/2%	23 1/2%
1 1/2 to 3	54 1/2%	40%			
	57 1/2%	44%			
LAP WELD					
2	50 1/2%	35%	2	32 1/2%	18 1/2%
2 1/2 to 6	53 1/2%	41%	2 1/2 to 4	34 1/2%	21 1/2%
BUTT WELD, EXTRA STRONG PLAIN ENDS					
1/2, 1 and 1 1/2	46 1/2%	29%	1 to 1 1/2	39 1/2%	24 1/2%
1 1/2 to 1 1/2	51 1/2%	39%			
	55 1/2%	43%			
LAP WELD, EXTRA STRONG PLAIN ENDS					
2	48 1/2%	37%	2	33 1/2%	20 1/2%
2 1/2 to 4	51 1/2%	40%	2 1/2 to 4	35 1/2%	23 1/2%
4 1/2 to 6	50 1/2%	39%	4 1/2 to 6	34 1/2%	22 1/2%

Stocks discounts in cities named are as follows:

	—New York—	—Cleveland—	—Chicago—
	Black	Galvanized	Black
1 to 3 in. steel butt welded	47%	31%	43 1/2%
3 1/2 to 3 in. steel lap welded	42%	27%	39 1/2%

Malleable fittings. Class B and C, from New York stock sell at list + 22 1/2%. Cast iron, standard sizes, net.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Hercules red stand, all constructions	20%
Patent flattened strand, special and cast steel	20%
Patent flattened strand, iron rope	5%
Plow steel round strand rope	35%
Special steel round strand rope	30%
Cast steel round strand rope	22 1/2%
Iron strand and iron tiller	5%
Galvanized iron rigging and guy rope	+12%

San Francisco: Galvanized, less 5%, bright less 25%. Chicago, +17 1/2% on galvanized, 35 off on bright.

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Large	—New York—	—One	—Cleveland	—Chicago
	Mill Lots	Current	Year Ago		
Blue Annealed	Pittsburgh				
No. 10	3.55-4.00	5.32-7.00	5.17	5.35	5.27
No. 12	3.60	5.37-7.10	5.22	5.40	5.32
No. 14	3.65-4.10	5.42	5.27	5.45	5.37
No. 16	3.75-4.20	5.52	5.37	5.55	5.47
Black					
Nos. 18 and 20	4.15-4.65	6.80-7.30	6.02	5.95	6.30
Nos. 22 and 24	4.20-4.70	6.85-7.35	6.07	6.00	6.35
No. 26	4.25-4.75	6.90-7.90	6.12	6.05	6.40
No. 28	4.35-4.85	7.00-8.00	6.22	6.15	6.50
Galvanized					
No. 10	4.70	6.90	8.22	5.05	6.65
No. 12	4.80	6.95	8.27	5.10	6.70
No. 14	4.80	7.10	8.42	5.25	6.85
Nos. 18 and 20	5.10	7.40	8.72	5.55	7.15
Nos. 22 and 24	5.25-5.75	7.80	7.12	6.95	7.55
No. 26	5.40-5.90	7.95	7.27	7.40	7.70
No. 28	5.70-6.20	8.25-9.00	7.57	7.50	8.00

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair size orders, the following amount is deducted from list:

	New York	—Cleveland—	—Chicago—	—St. Louis
	Current	One Year Ago	Current	One Year Ago
Hot pressed square	+ \$2.00	\$1.00	\$1.25	\$1.45
Hot pressed hexagon	+ 2.00	1.00	1.05	1.45
Cold punched square	+ 2.00	1.00	.75	1.05
Cold punched hexagon	+ 2.00	1.00	.75	1.05

Semi-finished nuts, $\frac{1}{2}$ and smaller, sell at the following discounts from list price:

	Current	One Year Ago
New York.....	6%	50-10%
Chicago.....	50%	50%
Cleveland.....	60-10%	50-10%
St. Louis.....	45%	

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago	St. Louis
1 by 4 in. and smaller.....	25%	50%	35-50%	50-50%
Larger and longer up to 1 in. by 30 in. 1".....	10%	40%	25-50%	40-50%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

	New York	Cleveland	Chicago
For wrought-iron washers:			
New York.....	\$1.50	\$4.50	\$3.00
For cast-iron washers the base price per 100 lb. is as follows:			
New York.....	\$7.00	\$3.75	\$4.25

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel $\frac{1}{2}$ and smaller.....	30%	55% off	4%
Tinned.....	3%	55% off	4%
Boiler, 1, 1 1/2 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:			
New York.....	\$6.00 base	\$4.00	\$4.97
Structural, same sizes:			
New York.....	\$6.10	\$4.10	\$5.07

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York	Cleveland	Chicago
Current	One	Current	One
Year Ago	Year Ago	Year Ago	Year Ago
Raw, 5-bbl. lots.....	\$1.80	\$1.49	\$2.05
5-gal. cans.....	2.00	1.74	2.25

WHITE AND RED LEAD—Base price.

	Current	Red	White
		1 Year Ago	Current 1 Year Ago
			Dry and Dry
			In Oil In Oil
100-lb. keg.....	15.00	16.50	13.00 14.50
25 and 50-lb. kegs.....	15.25	16.75	13.25 14.75
12-lb. keg.....	15.50	17.00	13.50 15.00
5-lb. cans.....	17.00	18.50	15.00 16.50
1-lb. cans.....	18.00	19.50	16.00 17.50

COMMON CRICK—The prices per 1000 in cargo or earload lots are as follows:

Chicago.....	\$14.00	Cincinnati.....	\$19.00
St. Louis, salmon.....	14.00	Birmingham.....	15.00

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	C.I.	1-Ply	L.C.I.	C.I.	2-Ply	L.C.I.	C.I.	3-Ply	L.C.I.
No. 1 grade.....	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00	\$3.25			
No. 2 grade.....	1.70	1.95	2.15	2.40	2.50	2.75			

Asbestos asphalt saturated felt (14 lb. per square) costs \$17.00 per 100 lb. Slate-surfaced roofing (red and green) in rolls of 108 sq. ft. costs \$3.00 per roll in earload lots and \$3.25 for smaller quantities. Shingles, red and green slate finish, cost \$7.25 per square in earloads, \$7.50 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago:

	Carload Lots	Less Than Carload Lots
	N. Y.	Chicago
Tar felt (14 lb. per square of 100 sq. ft.).....	\$84.00	\$82.00
Tar pitch (in 400-lb. bbl.).....	21.00	18.00
Asphalt pitch (in barrels).....	34.00	34.00
Asphalt felt.....	88.00	88.00

HOLLOW TILE—Price per block in earload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul.....	\$0.087	\$0.158	\$0.248
St. Louis.....	.12	.23	.31
Seattle.....	.09	.175	.30
Los Angeles.....	.082	.154	.236
New Orleans.....	.165	.22	.325
Pittsburgh.....	.065	.115	
Chicago.....	.09	.163	
Cincinnati.....	.101	.16925	.2864
Birmingham.....	.108	.192	

*F. o. b. factory, 4, 8 and 10 inch.

LUMBER—Price of pine per M in earload lots:

	1-In. Rough	2-In. T. and G.	8 x 8 In. x 20 Ft.
	10 In. x 16 Ft.	10 In. x 16 Ft.	
St. Louis.....	\$53.00	\$46.00	\$42.00
Birmingham.....	52.00	53.00	50.00
Cincinnati.....	60.00	60.00	55.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing	Gelatin	Black Powder
	20%	40%	60%
New York.....	\$0.27	\$0.30	\$2.20
Boston.....	.245	.25	2.40
Kansas City.....	.2275	.2525	2.35
New Orleans.....	.2375 (50%)	.2475	
Seattle.....	.1925	.2125	2.25
Chicago.....	.215	.2875	2.25
St. Paul.....	.185	.2525	2.25
St. Louis.....	.185	.2325	1.80
Los Angeles.....	.25	.35	2.95

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham
Cup.....	7-8	3.7 3.8	8.5
Fiber or sponge.....	7	7.2	8.5
Transmission.....	9-10	14.	8.5
Axle.....	5	5.	4.5
Gear.....	5	6.5	8.5
Car journal.....	5	4.7	8.5

BABBITT METAL—Warehouse prices in cents per pound:

	New York	Cleveland	Chicago
Current	One	Current	One
Year Ago	Year Ago	Year Ago	Year Ago
Best grade.....	90.00	87.00	70.00
Commercial.....	50.00	42.00	20.00

HOSE—Following are prices of various classes of hose:

	Fire	50-Ft. Lengths
Underwriters' 2 1/2-in.....		75c. per ft.
Common, 2 1/2-in.....		40%
	Air	
	First Grade	Second Grade
1-in. per ft.....	\$0.50	\$0.33
	Third Grade	
	\$0.22	
First grade.....	30%	40%
	Second grade.....	45%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
New York.....	2%	25%
St. Louis.....	3%	35%
Birmingham.....	35%	15%
Chicago.....	45%	40%
Cincinnati.....	30-5-24%	40 24%

RAWHIDE LACING—25% for cut; 86c. per sq. ft. for ordinary.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam.....	\$1.00
Asbestos for high-pressure steam.....	1.70
Duck and rubber for piston packing.....	1.00
Flax, regular.....	1.20
Flax, waterproofed.....	1.70
Compressed asbestos sheet.....	.90
Wire insulation asbestos sheet.....	1.50
Rubber sheet.....	.50
Rubber sheet, wire insertion.....	.70
Rubber sheet, duck insertion.....	.50
Rubber sheet, cloth insertion.....	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes.....	1.30
Asbestos wick, 1- and 1-lb. balls.....	.85

MANILA ROPE—For rope smaller than 1-in. the price is 1 to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: 1-in., 8 ft.; 1 1/2-in., 6 ft.; 2-in., 4 ft.; 3-in., 3 ft.; 4-in., 2 ft.; 5-in., 2 ft.; 6-in., 2 ft.; 8-in., 2 ft.; 10-in., 2 ft.; 12-in., 2 ft.; 14-in., 2 ft.; 16-in., 2 ft.; 18-in., 2 ft.; 20-in., 2 ft.; 22-in., 2 ft.; 24-in., 2 ft.; 26-in., 2 ft.; 28-in., 2 ft.; 30-in., 2 ft.; 32-in., 2 ft.; 34-in., 2 ft.; 36-in., 2 ft.; 38-in., 2 ft.; 40-in., 2 ft.; 42-in., 2 ft.; 44-in., 2 ft.; 46-in., 2 ft.; 48-in., 2 ft.; 50-in., 2 ft.; 52-in., 2 ft.; 54-in., 2 ft.; 56-in., 2 ft.; 58-in., 2 ft.; 60-in., 2 ft.; 62-in., 2 ft.; 64-in., 2 ft.; 66-in., 2 ft.; 68-in., 2 ft.; 70-in., 2 ft.; 72-in., 2 ft.; 74-in., 2 ft.; 76-in., 2 ft.; 78-in., 2 ft.; 80-in., 2 ft.; 82-in., 2 ft.; 84-in., 2 ft.; 86-in., 2 ft.; 88-in., 2 ft.; 90-in., 2 ft.; 92-in., 2 ft.; 94-in., 2 ft.; 96-in., 2 ft.; 98-in., 2 ft.; 100-in., 2 ft.; 102-in., 2 ft.; 104-in., 2 ft.; 106-in., 2 ft.; 108-in., 2 ft.; 110-in., 2 ft.; 112-in., 2 ft.; 114-in., 2 ft.; 116-in., 2 ft.; 118-in., 2 ft.; 120-in., 2 ft.; 122-in., 2 ft.; 124-in., 2 ft.; 126-in., 2 ft.; 128-in., 2 ft.; 130-in., 2 ft.; 132-in., 2 ft.; 134-in., 2 ft.; 136-in., 2 ft.; 138-in., 2 ft.; 140-in., 2 ft.; 142-in., 2 ft.; 144-in., 2 ft.; 146-in., 2 ft.; 148-in., 2 ft.; 150-in., 2 ft.; 152-in., 2 ft.; 154-in., 2 ft.; 156-in., 2 ft.; 158-in., 2 ft.; 160-in., 2 ft.; 162-in., 2 ft.; 164-in., 2 ft.; 166-in., 2 ft.; 168-in., 2 ft.; 170-in., 2 ft.; 172-in., 2 ft.; 174-in., 2 ft.; 176-in., 2 ft.; 178-in., 2 ft.; 180-in., 2 ft.; 182-in., 2 ft.; 184-in., 2 ft.; 186-in., 2 ft.; 188-in., 2 ft.; 190-in., 2 ft.; 192-in., 2 ft.; 194-in., 2 ft.; 196-in., 2 ft.; 198-in., 2 ft.; 200-in., 2 ft.; 202-in., 2 ft.; 204-in., 2 ft.; 206-in., 2 ft.; 208-in., 2 ft.; 210-in., 2 ft.; 212-in., 2 ft.; 214-in., 2 ft.; 216-in., 2 ft.; 218-in., 2 ft.; 220-in., 2 ft.; 222-in., 2 ft.; 224-in., 2 ft.; 226-in., 2 ft.; 228-in., 2 ft.; 230-in., 2 ft.; 232-in., 2 ft.; 234-in., 2 ft.; 236-in., 2 ft.; 238-in., 2 ft.; 240-in., 2 ft.; 242-in., 2 ft.; 244-in., 2 ft.; 246-in., 2 ft.; 248-in., 2 ft.; 250-in., 2 ft.; 252-in., 2 ft.; 254-in., 2 ft.; 256-in., 2 ft.; 258-in., 2 ft.; 260-in., 2 ft.; 262-in., 2 ft.; 264-in., 2 ft.; 266-in., 2 ft.; 268-in., 2 ft.; 270-in., 2 ft.; 272-in., 2 ft.; 274-in., 2 ft.; 276-in., 2 ft.; 278-in., 2 ft.; 280-in., 2 ft.; 282-in., 2 ft.; 284-in., 2 ft.; 286-in., 2 ft.; 288-in., 2 ft.; 290-in., 2 ft.; 292-in., 2 ft.; 294-in., 2 ft.; 296-in., 2 ft.; 298-in., 2 ft.; 300-in., 2 ft.; 302-in., 2 ft.; 304-in., 2 ft.; 306-in., 2 ft.; 308-in., 2 ft.; 310-in., 2 ft.; 312-in., 2 ft.; 314-in., 2 ft.; 316-in., 2 ft.; 318-in., 2 ft.; 320-in., 2 ft.; 322-in., 2 ft.; 324-in., 2 ft.; 326-in., 2 ft.; 328-in., 2 ft.; 330-in., 2 ft.; 332-in., 2 ft.; 334-in., 2 ft.; 336-in., 2 ft.; 338-in., 2 ft.; 340-in., 2 ft.; 342-in., 2 ft.; 344-in., 2 ft.; 346-in., 2 ft.; 348-in., 2 ft.; 350-in., 2 ft.; 352-in., 2 ft.; 354-in., 2 ft.; 356-in., 2 ft.; 358-in., 2 ft.; 360-in., 2 ft.; 362-in., 2 ft.; 364-in., 2 ft.; 366-in., 2 ft.; 368-in., 2 ft.; 370-in., 2 ft.; 372-in., 2 ft.; 374-in., 2 ft.; 376-in., 2 ft.; 378-in., 2 ft.; 380-in., 2 ft.; 382-in., 2 ft.; 384-in., 2 ft.; 386-in., 2 ft.; 388-in., 2 ft.; 390-in., 2 ft.; 392-in., 2 ft.; 394-in., 2 ft.; 396-in., 2 ft.; 398-in., 2 ft.; 400-in., 2 ft.; 402-in., 2 ft.; 404-in., 2 ft.; 406-in., 2 ft.; 408-in., 2 ft.; 410-in., 2 ft.; 412-in., 2 ft.; 414-in., 2 ft.; 416-in., 2 ft.; 418-in., 2 ft.; 420-in., 2 ft.; 422-in., 2 ft.; 424-in., 2 ft.; 426-in., 2 ft.; 428-in., 2 ft.; 430-in., 2 ft.; 432-in., 2 ft.; 434-in., 2 ft.; 436-in., 2 ft.; 438-in., 2 ft.; 440-in., 2 ft.; 442-in., 2 ft.; 444-in., 2 ft.; 446-in., 2 ft.; 448-in., 2 ft.; 450-in., 2 ft.; 452-in., 2 ft.; 454-in., 2 ft.; 456-in., 2 ft.; 458-in., 2 ft.; 460-in., 2 ft.; 462-in., 2 ft.; 464-in., 2 ft.; 466-in., 2 ft.; 468-in., 2 ft.; 470-in., 2 ft.; 472-in., 2 ft.; 474-in., 2 ft.; 476-in., 2 ft.; 478-in., 2 ft.; 480-in., 2 ft.; 482-in., 2 ft.; 484-in., 2 ft.; 486-in., 2 ft.; 488-in., 2 ft.; 490-in., 2 ft.; 492-in., 2 ft.; 494-in., 2 ft.; 496-in., 2 ft.; 498-in., 2 ft.; 500-in., 2 ft.; 502-in., 2 ft.; 504-in., 2 ft.; 506-in., 2 ft.; 508-in., 2 ft.; 510-in., 2 ft.; 512-in., 2 ft.; 514-in., 2 ft.; 516-in., 2 ft.; 518-in., 2 ft.; 520-in., 2 ft.; 522-in., 2 ft.; 524-in., 2 ft.; 526-in., 2 ft.; 528-in., 2 ft.; 530-in., 2 ft.; 532-in., 2 ft.; 534-in., 2 ft.; 536-in., 2 ft.; 538-in., 2 ft.; 540-in., 2 ft.; 542-in., 2 ft.; 544-in., 2 ft.; 546-in., 2 ft.; 548-in., 2 ft.; 550-in., 2 ft.; 552-in., 2 ft.; 554-in., 2 ft.; 556-in., 2 ft.; 558-in., 2 ft.; 560-in., 2 ft.; 562-in., 2 ft.; 564-in., 2 ft.; 566-in., 2 ft.; 568-in., 2 ft.; 570-in., 2 ft.; 572-in., 2 ft.; 574-in., 2 ft.; 576-in., 2 ft.; 578-in., 2 ft.; 580-in., 2 ft.; 582-in., 2 ft.; 584-in., 2 ft.; 586-in., 2 ft.; 588-in., 2 ft.; 590-in., 2 ft.; 592-in., 2 ft.; 594-in., 2 ft.; 596-in., 2 ft.; 598-in., 2 ft.; 600-in., 2 ft.; 602-in., 2 ft.; 604-in., 2 ft.; 606-in., 2 ft.; 608-in., 2 ft.; 610-in., 2 ft.; 612-in., 2 ft.; 614-in., 2 ft.; 616-in., 2 ft.; 618-in., 2 ft.; 620-in., 2 ft.; 622-in., 2 ft.; 624-in., 2 ft.; 626-in., 2 ft.; 628-in., 2 ft.; 630-in., 2 ft.; 632-in., 2 ft.; 634-in., 2 ft.; 636-in., 2 ft.; 638-in., 2 ft.; 640-in., 2 ft.; 642-in., 2 ft.; 644-in., 2 ft.; 646-in., 2 ft.; 648-in., 2 ft.; 650-in., 2 ft.; 652-in., 2 ft.; 654-in., 2 ft.; 656-in., 2 ft.; 658-in., 2 ft.; 660-in., 2 ft.; 662-in., 2 ft.; 664-in., 2 ft.; 666-in., 2 ft.; 668-in., 2 ft.; 670-in., 2 ft.; 672-in., 2 ft.; 674-in., 2 ft.; 676-in., 2 ft.; 678-in., 2 ft.; 680-in., 2 ft.; 682-in., 2 ft.; 684-in., 2 ft.; 686-in., 2 ft.; 688-in., 2 ft.; 690-in., 2 ft.; 692-in., 2 ft.; 694-in., 2 ft.; 696-in., 2 ft.; 698-in., 2 ft.; 700-in., 2 ft.; 702-in., 2 ft.; 704-in., 2 ft.; 706-in., 2 ft.; 708-in., 2 ft.; 710-in., 2 ft.; 712-in., 2 ft.; 714-in., 2 ft.; 716-in., 2 ft.; 718-in., 2 ft.; 720-in., 2 ft.; 722-in., 2 ft.; 724-in., 2 ft.; 726-in., 2 ft.; 728-in., 2 ft.; 730-in., 2 ft.; 732-in., 2 ft.; 734-in., 2 ft.; 736-in., 2 ft.; 738-in., 2 ft.; 740-in., 2 ft.; 742-in., 2 ft.; 744-in., 2 ft.; 746-in., 2 ft.; 748-in., 2 ft.; 750-in., 2 ft.; 752-in., 2 ft.; 754-in., 2 ft.; 756-in., 2 ft.; 758-in., 2 ft.; 760-in., 2 ft.; 762-in., 2 ft.; 764-in., 2 ft.; 766-in., 2 ft.; 768-in., 2 ft.; 770-in., 2 ft.; 772-in., 2 ft.; 774-in., 2 ft.; 776-in., 2 ft.; 778-in., 2 ft.; 780-in., 2 ft.; 782-in., 2 ft.; 784-in., 2 ft.; 786-in., 2 ft.; 788-in., 2 ft.; 790-in., 2 ft.; 792-in., 2 ft.; 794-in., 2 ft.; 796-in., 2 ft.; 798-in., 2 ft.; 800-in., 2 ft.; 802-in., 2 ft.; 804-in., 2 ft.; 806-in., 2 ft.; 808-in., 2 ft.; 810-in., 2 ft.; 812-in., 2 ft.; 814-in., 2 ft.; 816-in., 2 ft.; 818-in., 2 ft.; 820-in., 2 ft.; 822-in., 2 ft.; 824-in., 2 ft.; 826-in., 2 ft.; 828-in., 2 ft.; 830-in., 2 ft.; 832-in., 2 ft.; 834-in., 2 ft.; 836-in., 2 ft.; 838-in., 2 ft.; 840-in., 2 ft.; 842-in., 2 ft.; 844-in., 2 ft.; 846-in., 2 ft.; 848-in., 2 ft.; 850-in., 2 ft.; 852-in., 2 ft.; 854-in., 2 ft.; 856-in., 2 ft.; 858-in., 2 ft.; 860-in., 2 ft.; 862-in., 2 ft.; 864-in., 2 ft.; 866-in., 2 ft.; 868-in., 2 ft.; 870-in., 2 ft.; 872-in., 2 ft.; 874-in., 2 ft.; 876-in., 2 ft.; 878-in., 2 ft.; 880-in., 2 ft.; 882-in., 2 ft.; 884-in., 2 ft.; 886-in., 2 ft.; 888-in., 2 ft.; 890-in., 2 ft.; 892-in., 2 ft.; 894-in., 2 ft.; 896-in., 2 ft.; 898-in., 2 ft.; 900-in., 2 ft.; 902-in., 2 ft.; 904-in., 2 ft.; 906-in., 2 ft.; 908-in., 2 ft.; 910-in., 2 ft.; 912-in., 2 ft.; 914-in., 2 ft.; 916-in., 2 ft.; 918-in., 2 ft.; 920-in., 2 ft.; 922-in., 2 ft.; 924-in., 2 ft.; 926-in., 2 ft.; 928-in., 2 ft.; 930-in., 2 ft.; 932-in., 2 ft.; 934-in., 2 ft.; 936-in., 2 ft.; 938-in., 2 ft.; 940-in., 2 ft.; 942-in., 2 ft.; 944-in., 2 ft.; 946-in., 2 ft.; 948-in., 2 ft.; 950-in., 2 ft.; 952-in., 2 ft.; 954-in., 2 ft.; 956-in., 2 ft.; 958-in., 2 ft.; 960-in., 2 ft.; 962-in., 2 ft.; 964-in., 2 ft.; 966-in., 2 ft.; 968-in., 2 ft.; 970-in., 2 ft.; 972-in., 2 ft.; 974-in., 2 ft.; 976-in., 2 ft.; 978-in., 2 ft.; 980-in., 2 ft.; 982-in., 2 ft.; 984-in., 2 ft.; 986-in., 2 ft.; 988-in., 2 ft.; 990-in., 2 ft.; 992-in., 2 ft.; 994-in., 2 ft.; 996-in., 2 ft.; 998-in., 2 ft.; 1000-in., 2 ft.; 1002-in., 2 ft.; 1004-in., 2 ft.; 1006-in., 2 ft.; 1008-in., 2 ft.; 1010-in., 2 ft.; 1012-in., 2 ft.; 1014-in., 2 ft.; 1016-in., 2 ft.; 1018-in., 2 ft.; 1020-in., 2 ft.; 1022-in., 2 ft.; 1024-in., 2 ft.; 1026-in., 2 ft.; 1028-in., 2 ft.; 1030-in., 2 ft.; 1032-in., 2 ft.; 1034-in., 2 ft.; 1036-in., 2 ft.; 1038-in., 2 ft.; 1040-in., 2 ft.; 1042-in., 2 ft.; 1044-in., 2 ft.; 1046-in., 2 ft.; 1048-in., 2 ft.; 1050-in., 2 ft.; 1052-in., 2 ft.; 1054-in., 2 ft.; 1056-in., 2 ft.; 1058-in., 2 ft.; 1060-in., 2 ft.; 1062-in., 2 ft.; 1064-in., 2 ft.; 1066-in., 2 ft.; 1068-in., 2 ft.; 1070-in., 2 ft.; 1072-in., 2 ft.; 1074-in., 2 ft.; 1076-in., 2 ft.; 1078-in., 2 ft.; 1080-in., 2 ft.; 1082-in., 2 ft.; 1084-in., 2 ft.; 1086-in., 2 ft.; 1088-in., 2 ft.; 1090-in., 2 ft.; 1092-in., 2 ft.; 1094-in., 2 ft.; 1096-in., 2 ft.; 1098-in., 2 ft.; 1100-in., 2 ft.; 1102-in., 2 ft.; 1104-in., 2 ft.; 1106-in., 2 ft.; 1108-in., 2 ft.; 1110-in., 2 ft.; 1112-in., 2 ft.; 1114-in., 2 ft.; 1116-in., 2 ft.; 1118-in., 2 ft.; 1120-in., 2 ft.; 1122-in., 2 ft.; 1124-in., 2 ft.; 1126-in., 2 ft.; 1128-in., 2 ft.; 1130-in., 2 ft.; 1132-in., 2 ft.; 1134-in., 2 ft.; 1136-in., 2 ft.; 1138-in., 2 ft.; 1140-in., 2 ft.; 1142-in., 2 ft.; 1144-in., 2 ft.; 1146-in., 2 ft.; 1148-in., 2 ft.; 1150-in., 2 ft.; 1152-in., 2 ft.; 1154-in., 2 ft.; 1156-in., 2 ft.; 1158-in., 2 ft.; 1160-in., 2 ft.; 1162-in., 2 ft.; 1164-in., 2 ft.; 1166-in., 2 ft.; 1168-in., 2 ft.; 1170-in., 2 ft.; 1172-in., 2 ft.; 1174-in., 2 ft.; 1176-in., 2 ft.; 1178-in., 2 ft.; 1180-in., 2 ft.; 1182-in., 2 ft.; 1184-in., 2 ft.; 1186-in., 2 ft.; 1188-in., 2 ft.; 1190-in., 2 ft.; 1192-in., 2 ft.; 1194-in., 2 ft.; 1196-in., 2 ft.; 1198-in., 2 ft.; 1200-in., 2 ft.; 1202-in., 2 ft.; 1204-in., 2 ft.; 12